

Social Media Portfolio

Developing a portfolio of Instagram posts about a
climate-related topic: Biofuels

Jia Yazon

The Final Post


First, I want to show you the final and improved Instagram post I created. This post uses features from Post 1, 2 and 3, and has been improved using feedback from my third round of user-testing. In the sections afterward, I show the earlier stages of my portfolio. I hope you enjoy!

Final Post – Slide 1


TOPIC: RENEWABLE ENERGY

Biofuel Research


Research shows potential for fuels made from biomass, a.k.a. biofuels. Engineers at WPI are learning how to make biofuel production more sustainable.



Swipe to learn more



Caption:

 Biofuels are a growing source of renewable energy, showing that a sustainable future doesn't have to be limited to solar and wind! Swipe to read more about how engineers are making this alternate fuel.

...


Hydrothermal Liquefaction (HTL) is a process that scientists and engineers can use to make biofuels. However, the process creates a toxic water-phase byproduct. Researchers at Worcester Polytechnic Institute are trying to research ways to remove the toxic chemicals in the waste stream.

The chemicals that are contaminating the stream are organic compounds. The total organic content (TOC), however, decreases as the waste stream undergoes a process that WPI researchers are calling Aqueous Phase Upgrading (APU).

The APU team at WPI is studying the performance of a solid, zeolite catalyst (ZSM-5) in a continuous, packed-bed reactor. Overall, the team has made progress in understanding ZSM-5's ability to upgrade the waste stream.

This additional process may cost more when adding it to the HTL process, however, it has the potential to make biofuels a more affordable, and much cleaner option than traditional fossil fuels!

Final Post – Slide 2




Biofuels could be the **future** of sustainable transportation.

For example, in 2023, Virgin Atlantic landed the first flight ever fully powered by biofuels [1].

Image: Virgin Atlantic Golf Holidays

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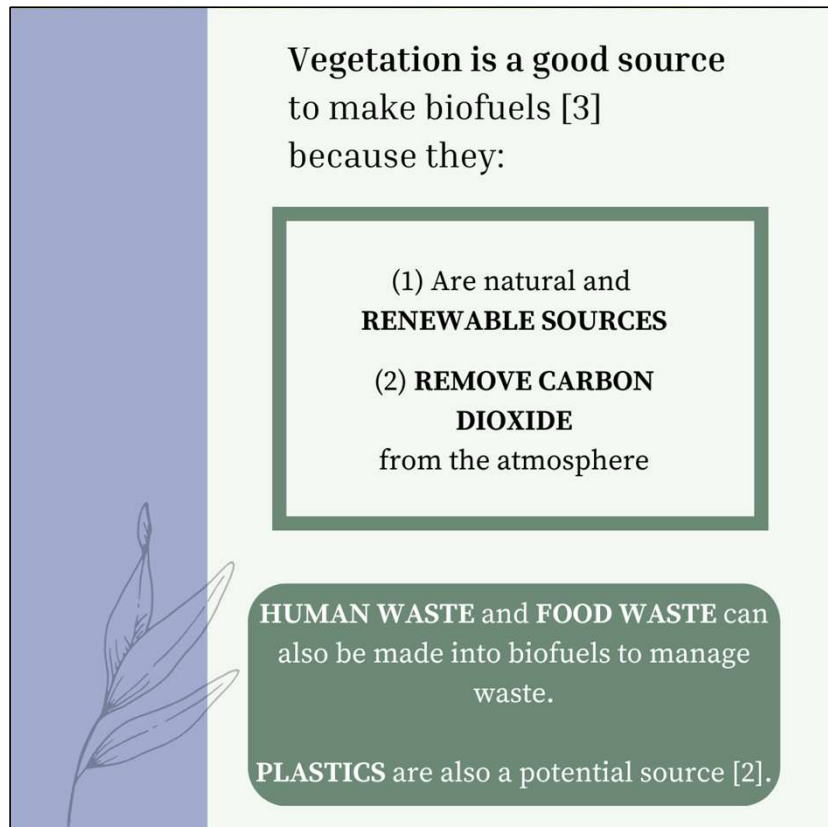
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Final Post – Slide 3



Vegetation is a good source to make biofuels [3] because they:


(1) Are natural and **RENEWABLE SOURCES**

(2) **REMOVE CARBON DIOXIDE** from the atmosphere

HUMAN WASTE and **FOOD WASTE** can also be made into biofuels to manage waste.

PLASTICS are also a potential source [2].

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Final Post – Slide 4




A growing biofuel-making process is **Hydrothermal Liquefaction (HTL)**.

However, HTL produces a toxic wastewater stream that requires further treatment before release to the environment [4].



Images: CanvaPro

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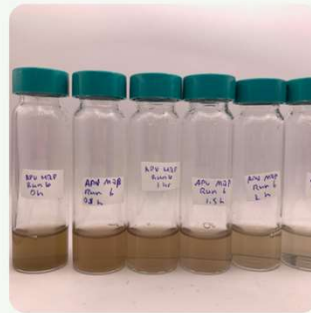
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Final Post – Slide 5

Researchers are finding ways to improve HTL by treating the wastewater, also called the HTL-aqueous phase, or HTL-AP.


They can extract useful chemicals, which will lower HTL-AP toxicity and make HTL and biofuel less expensive.

Shown below are samples from a Worcester Polytechnic Institute research lab, before (left) and after (right) HTL-APU treatment.



Images: Self-Taken

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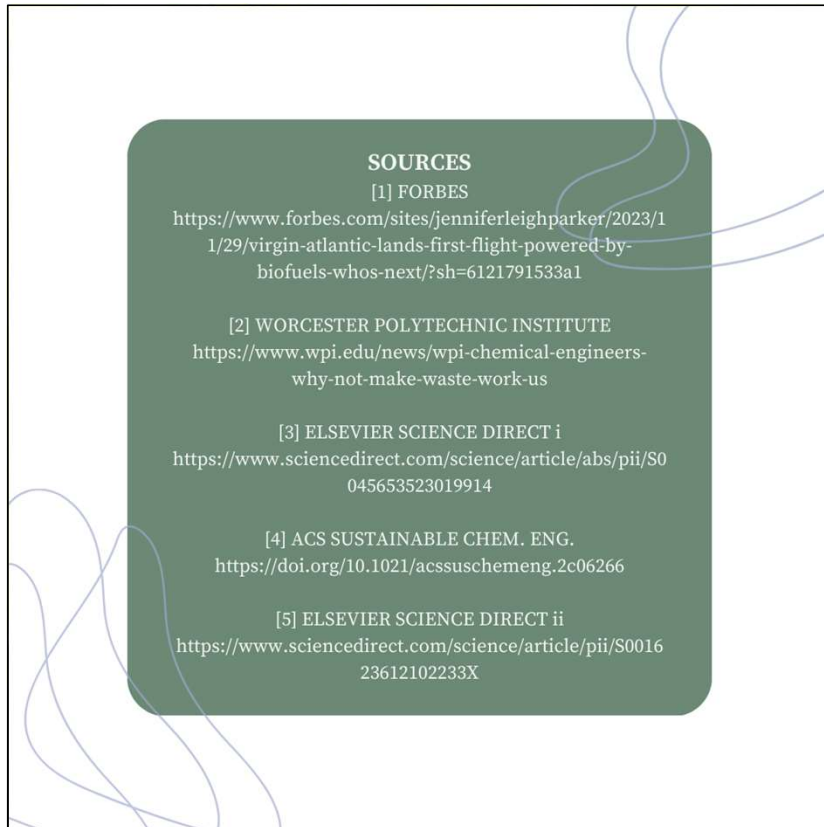
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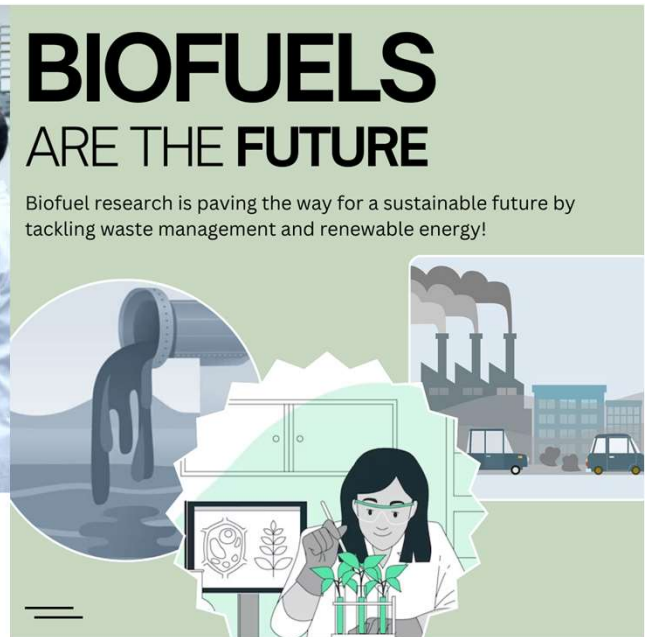
Round 1 of Portfolio Development

Cover images for an Instagram carousel

Posts 1, 2, and 3



WPI engineers are researching how to make biofuels, a renewable energy source, more reliable.



Round 2 of Portfolio Development

Improved designs and full carousels

Post 1



Caption:

Experts in biotechnology are excited about biofuels as an alternative to fossil fuels. Biofuels can be made from biomass such as food waste, human waste, and vegetation—including algae (1).

Biofuel production converts biomass into crude oils that will then require refining. Algae is an especially important biomass source due to its “faster growth rate and capability of greenhouse gas absorption,” in other words convenient while also effective at removing carbon dioxide from the atmosphere. (2)

One promising method to convert biomass, including algae, is Hydrothermal Liquefaction (HTL). However, this technology has many undesired byproducts, such as a toxic wastewater stream called the Aqueous Phase (HTL-AP), that must be treated before being released to the environment (2, 3).

Scientists and engineers are studying how to improve these processes to make biofuels a more reliable source. This includes optimizing the HTL process itself, as well as finding ways to treat the toxic HTL-AP.

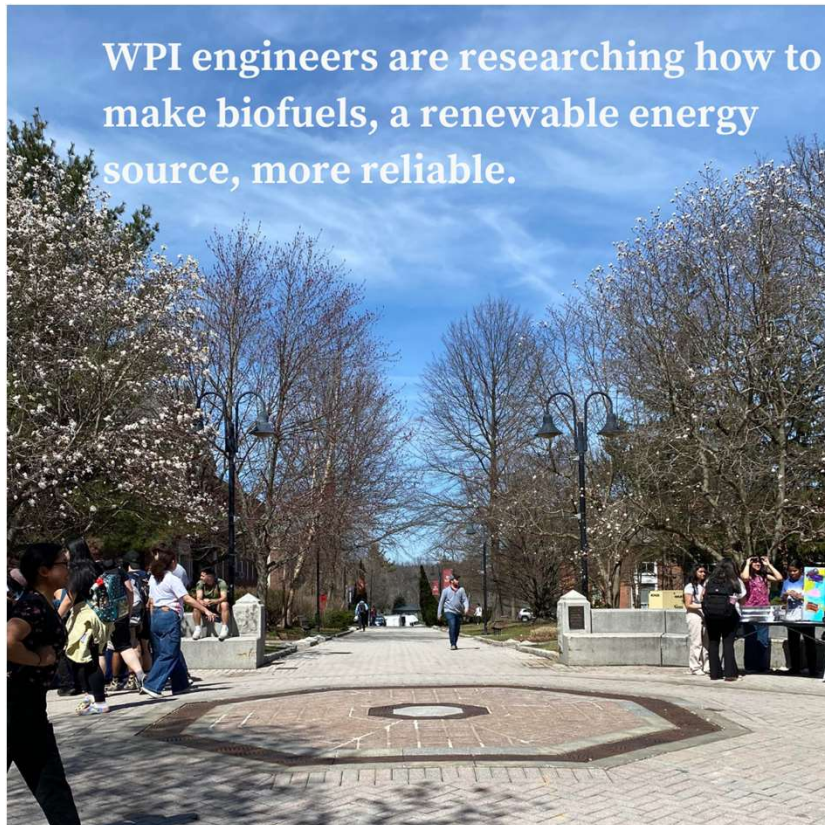
(1) <https://pubmed.ncbi.nlm.nih.gov/21833344/>

(2)

<https://www.sciencedirect.com/science/article/pii/S0045653523019914>

(3) <https://doi.org/10.1021/acssuschemeng.2c06266>

Post 2 – Slide 1



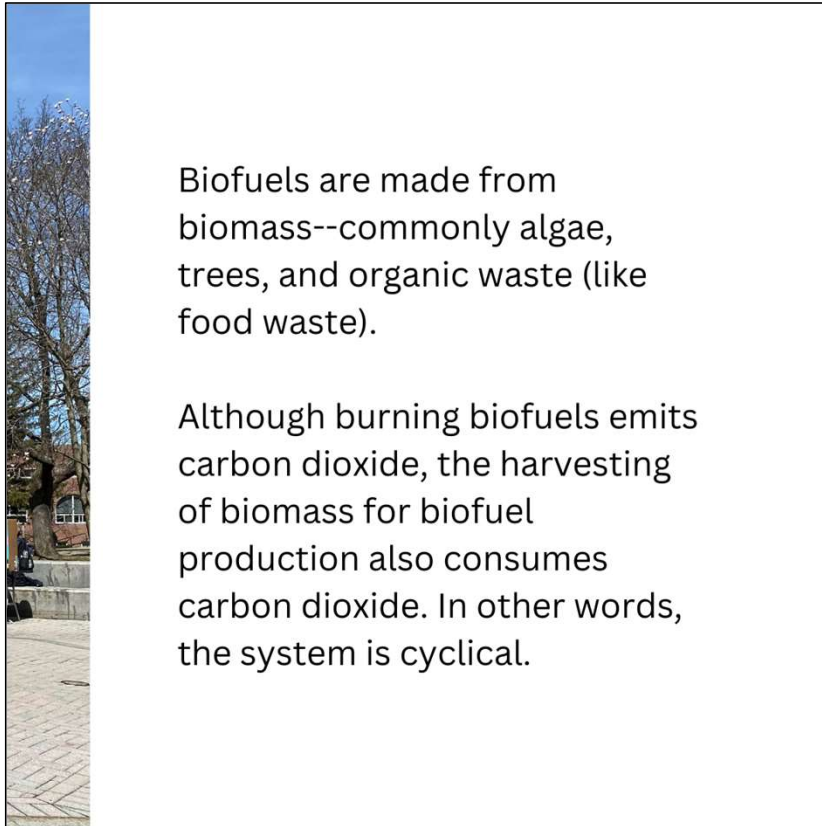
Caption:

Researchers at Worcester Polytechnic Institute (WPI) are studying biofuels, a promising source of renewable energy.

Biofuels can replace fossil fuels and lower total carbon dioxide emissions, especially as plants and waste are main sources of biofuel.

Undergraduate and graduate research projects at WPI are helping uncover more knowledge in the field.

Post 2 – Slide 2



Biofuels are made from biomass--commonly algae, trees, and organic waste (like food waste).

Although burning biofuels emits carbon dioxide, the harvesting of biomass for biofuel production also consumes carbon dioxide. In other words, the system is cyclical.

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Post 2 – Slide 3

A popular technique to make biofuels is **Hydrothermal Liquefaction (HTL)**. However, HTL uses water and produces a toxic wastewater stream that must be treated.

Students and faculty in WPI's chemical engineering department are researching HTL and ways to treat the wastewater.

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Post 2 – Slide 4

The wastewater stream is toxic due to contaminating chemicals, which are mainly organic (or carbon-containing). The stream is sometimes called the Aqueous Phase (AP).

The process of cleaning the AP is called **Aqueous Phase Upgrading (APU)**.



Caption:

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Post 2 – Slide 5



APU removes the organic contaminants by flowing the liquid AP over a solid catalyst, which helps break the chemical bonds within the contaminants.

Caption:

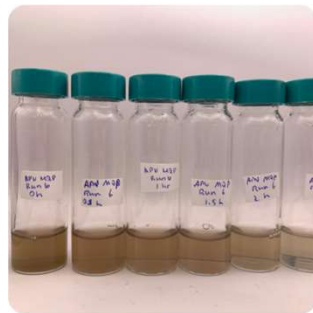
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Post 2 – Slide 6

As a result, the AP goes from a dark brown color to a lighter and much less toxic liquid.



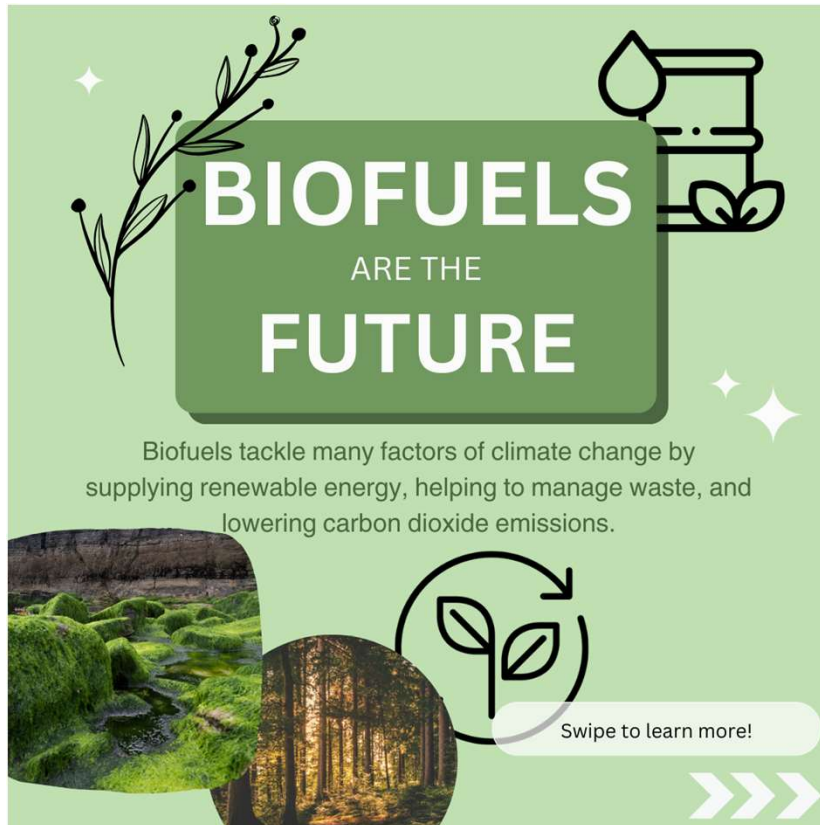
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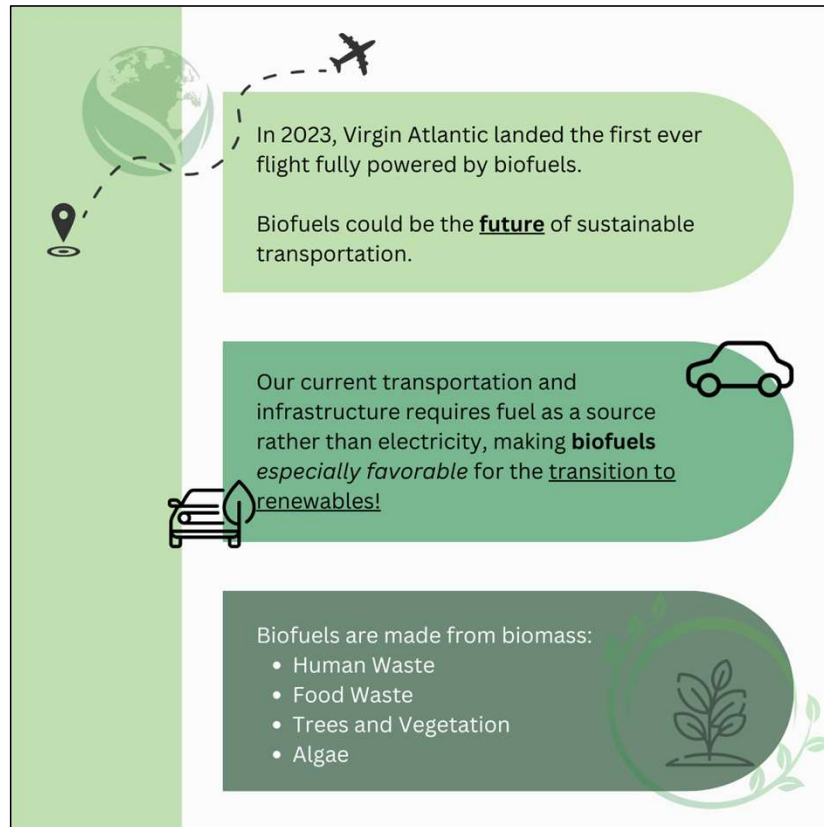
Post 3 – Slide 1



Caption:

More than solar panels and wind power, clean energy can be fuels made from renewable sources 🌱♻️

Post 3 – Slide 2



The infographic is a vertical layout with a light green background. It features three main text boxes connected by a dashed line that starts from a globe icon at the top left and ends at a plant icon at the bottom right. The top box is light green and contains text about Virgin Atlantic's biofuel flight. The middle box is a darker green and discusses the need for fuel in current transportation. The bottom box is the darkest green and lists biomass sources. Icons include a globe, an airplane, a location pin, a car, a truck, and a plant.

In 2023, Virgin Atlantic landed the first ever flight fully powered by biofuels.

Biofuels could be the **future** of sustainable transportation.

Our current transportation and infrastructure requires fuel as a source rather than electricity, making **biofuels** *especially favorable* for the transition to renewables!

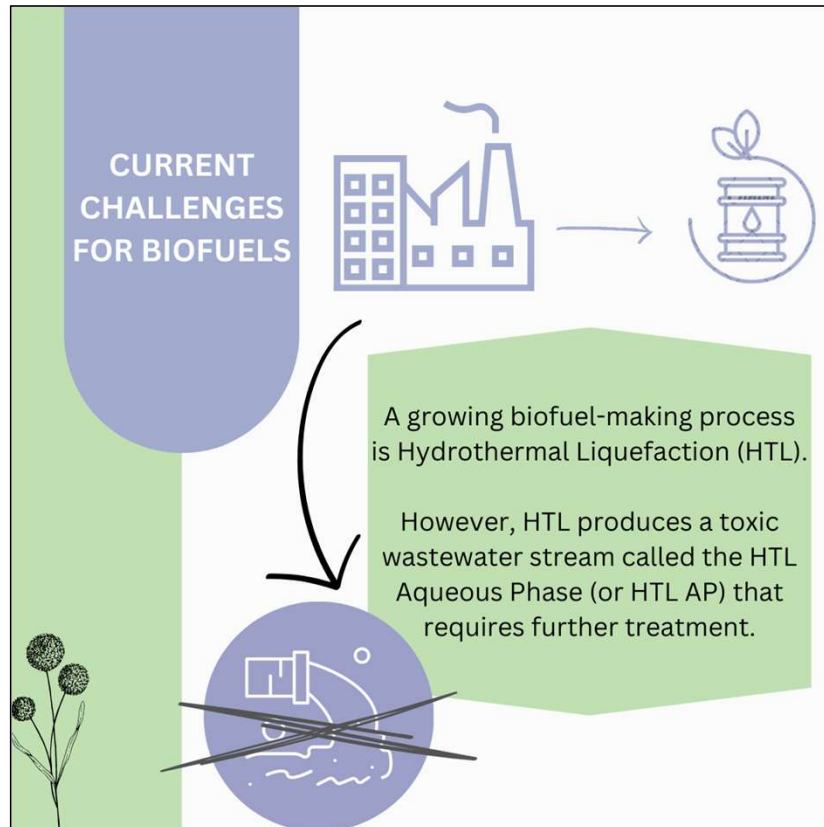
Biofuels are made from biomass:

- Human Waste
- Food Waste
- Trees and Vegetation
- Algae

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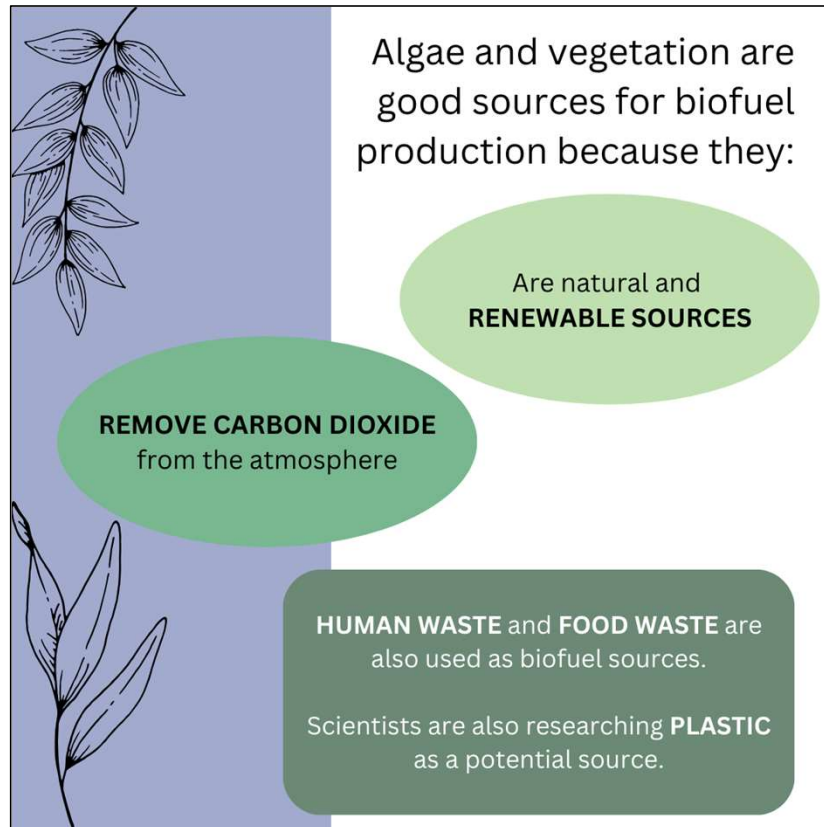
Post 3 – Slide 3



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Post 3 – Slide 4



The infographic features a light purple background on the left side with two line drawings of leafy branches. The right side is white and contains text and three green callout boxes. The top box is an oval containing the text 'Are natural and RENEWABLE SOURCES'. The middle box is an oval containing the text 'REMOVE CARBON DIOXIDE from the atmosphere'. The bottom box is a rounded rectangle containing the text 'HUMAN WASTE and FOOD WASTE are also used as biofuel sources. Scientists are also researching PLASTIC as a potential source.'

Algae and vegetation are good sources for biofuel production because they:

- Are natural and **RENEWABLE SOURCES**
- REMOVE CARBON DIOXIDE** from the atmosphere
- HUMAN WASTE** and **FOOD WASTE** are also used as biofuel sources. Scientists are also researching **PLASTIC** as a potential source.

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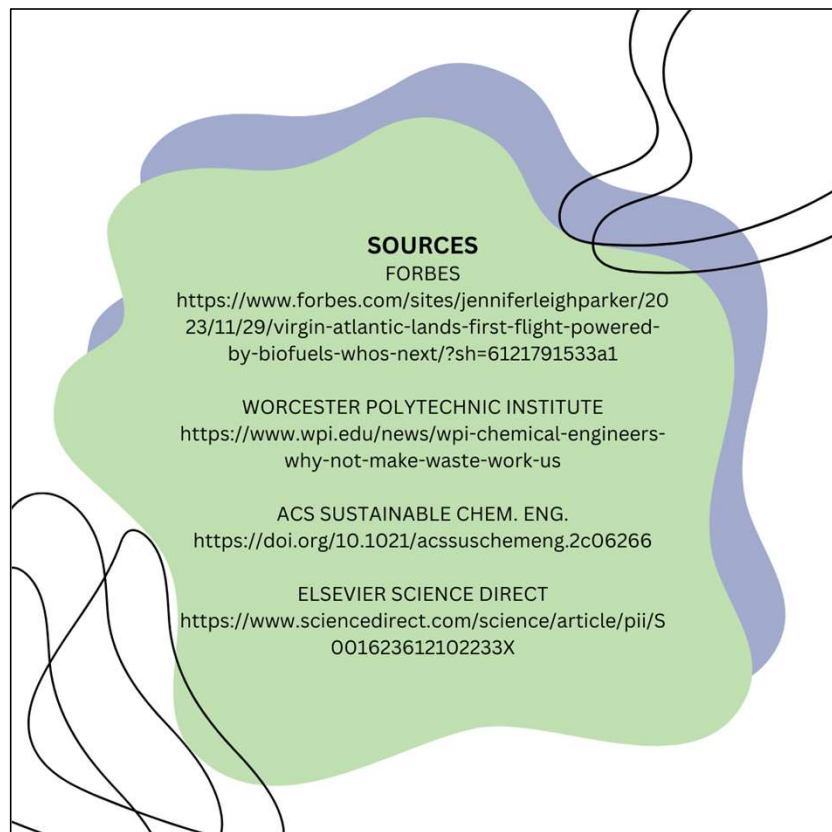
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Post 3 – Slide 6



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Round 3 of Portfolio Development


Drafting Post 4, which pulls together aspects from Post 1, 2, and 3

Post 4 – Slide 1

TOPIC: RENEWABLE ENERGY

Biofuel Research


Recent research in renewable energy shows potential in fuels made from biomass as a clean energy source. Engineers at WPI are learning how to make biofuel production more sustainable.




Swipe to learn more

Images: CanvaPro

Caption:

 Biofuels are a growing source of renewable energy, showing that a sustainable future doesn't have to be limited to solar and wind! Swipe to read more about how engineers are making this alternate fuel.

Post 4 – Slide 2



In 2023, Virgin Atlantic landed the first ever flight fully powered by biofuels [1].

Biofuels could be the **future** of sustainable transportation.

Most infrastructure and modes of transportation require **fuel** as a source rather than alternate forms (like electricity, hydrogen, etc.).

This makes **biofuels** especially favorable for the transition to renewables.






Image: Virgin Atlantic Golf Holidays

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 Biofuels are a growing source of renewable energy, showing that a sustainable future doesn't have to be limited to solar and wind! Swipe to read more about how engineers are making this alternate fuel.

Post 4 – Slide 3




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However, HTL produces a toxic wastewater stream called the HTL Aqueous Phase (or HTL AP) that requires further treatment before release to the environment [4].

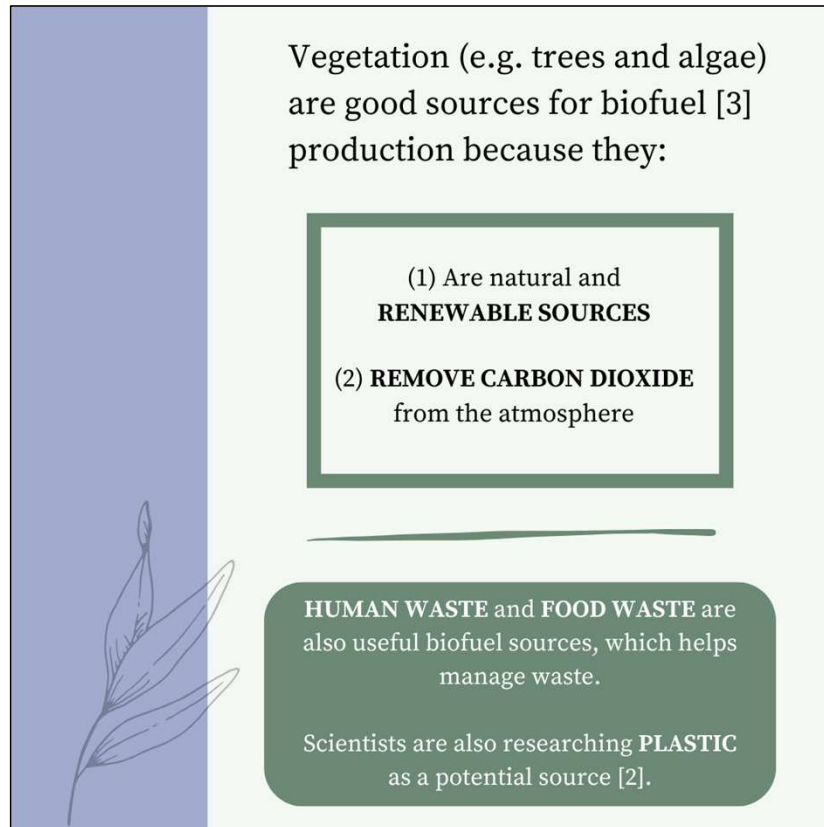


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Post 4 – Slide 4




Vegetation (e.g. trees and algae) are good sources for biofuel [3] production because they:

- (1) Are natural and **RENEWABLE SOURCES**
- (2) **REMOVE CARBON DIOXIDE** from the atmosphere

HUMAN WASTE and **FOOD WASTE** are also useful biofuel sources, which helps manage waste.

Scientists are also researching **PLASTIC** as a potential source [2].

Caption:

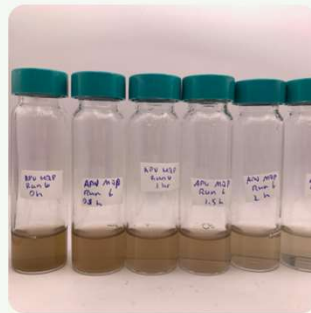
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Post 4 – Slide 5

Researchers are finding ways to improve HTL by treating the HTL AP.


We can extract valuable chemicals from the HTL AP for more uses. This will lower the HTL-AP toxicity while making HTL and biofuel cost less.

For example, shown below are samples from a Worcester Polytechnic Institute research lab. The HTL AP goes from a dark brown color to a much lighter, less-contaminated state.

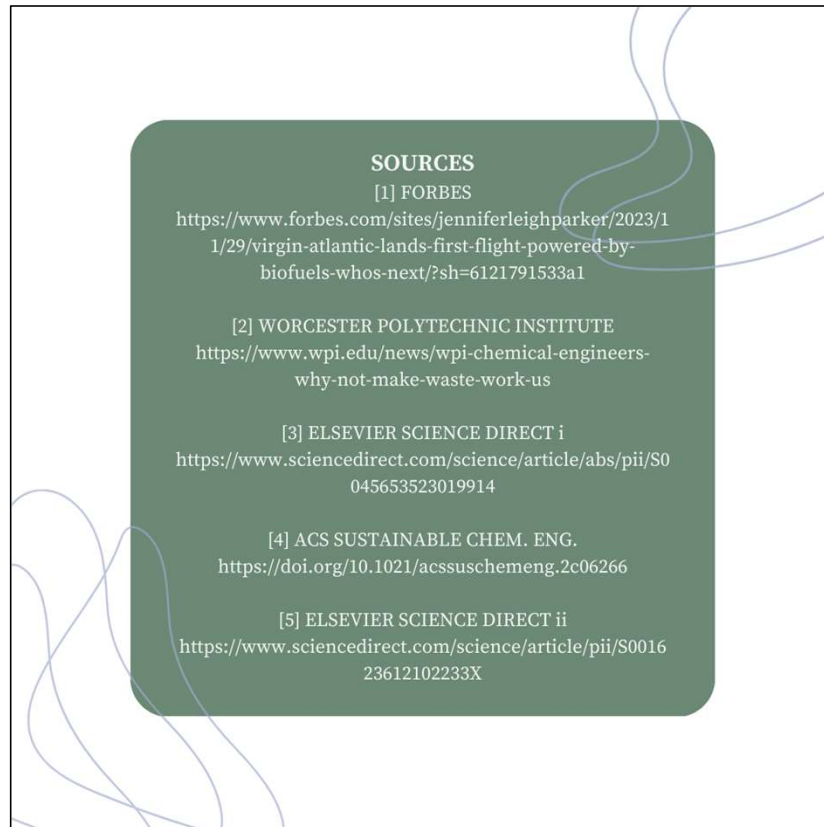


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