Algae

A Biofuel With Promise

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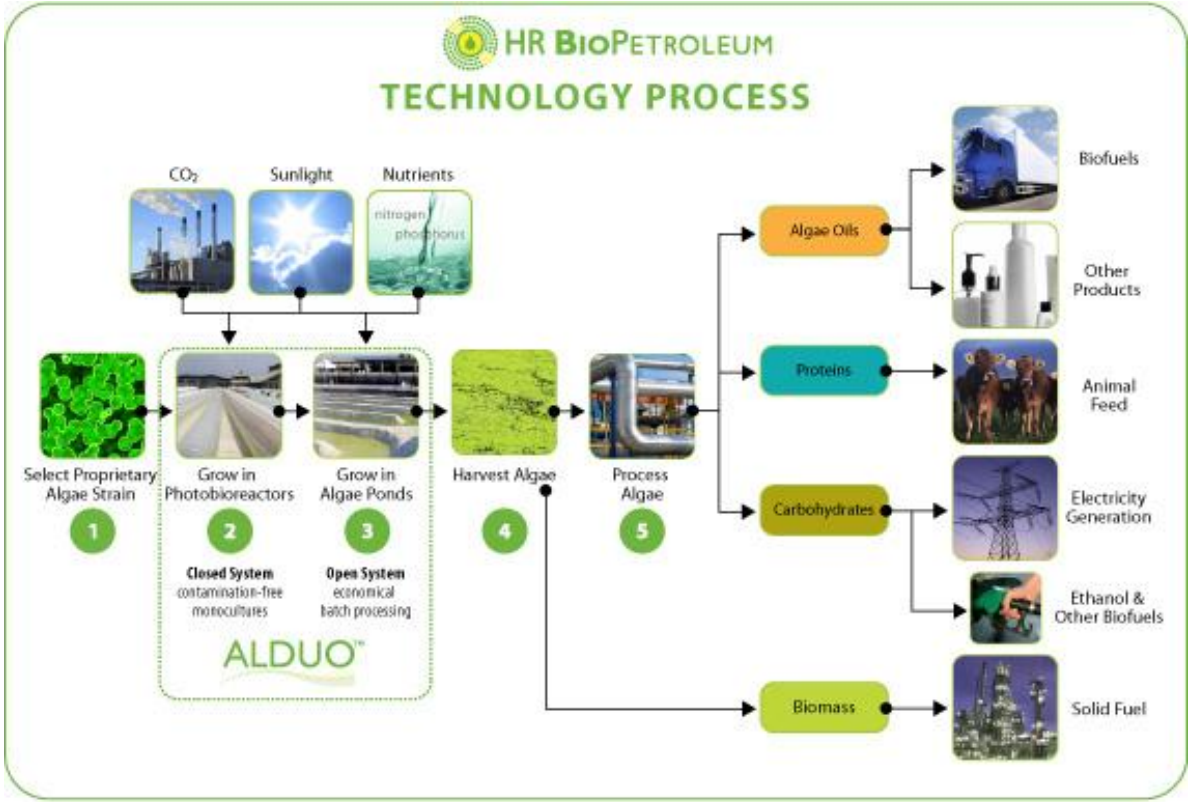
http://www.organicsoul.com/wp-content/uploads/2011/10/Petro_Algae.jpg

Definition

A simple, non-flowering, and typically aquatic plant of a large assemblage that includes the seaweeds and many single-celled forms. Algae contain chlorophyll but lack true stems, roots, leaves, and vascular tissue (Oxford Dictionary)



https://gigaom2.files.wordpress.com/2008/07/technology-flow-diagram-box.jpg

Description

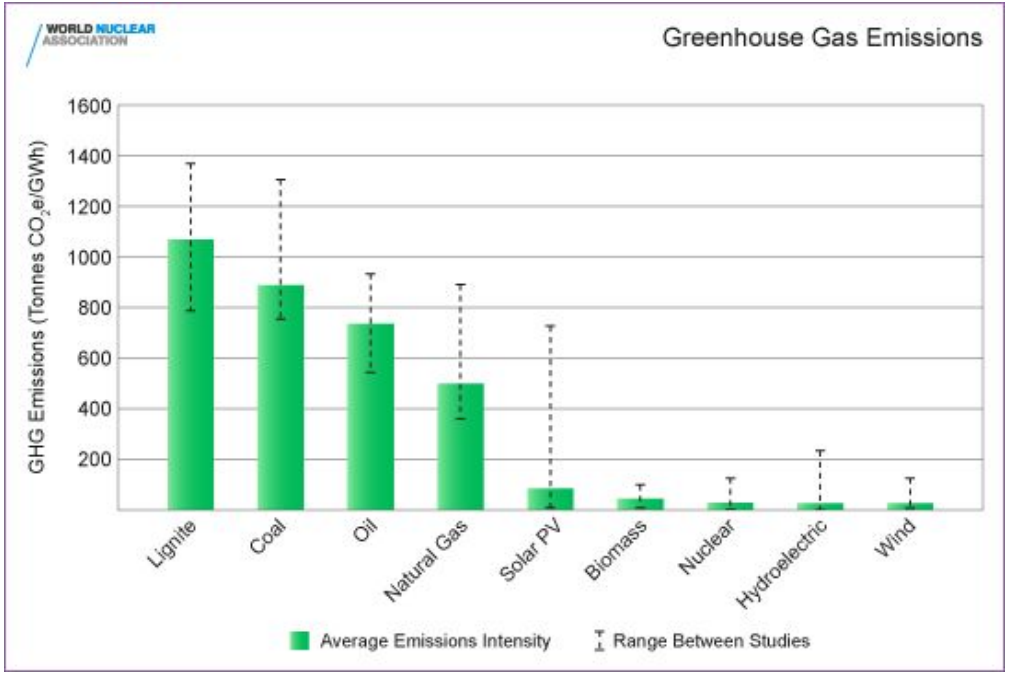
Crop	Oil Yield (Gallons/Acre)
Corn	18
Cotton	35
Soybean	48
Mustard Seed	61
Sunflower	102
Rapeseed (Canola)	127
Jatropha	202
Oil Palm	635
Algae	10,000

http://images.angelpub.com/2008/27/947/algae-yields-2.gif

- Biodiesel, ethanol, biojet fuel, green gasoline, ...etc
- Grown in open ponds or photobioreactors
- Uses greenhouse gases to grow
- Out produces other forms of biofuel
- How It's Made

Relevance

- Eco-friendly
  - Decrease in green gas emissions
  - Salt water vs Fresh water (Exxon-Mobil)
- Global Economy & Energy Industry
  - Decreasing supply of crude oil
  - Increasing demand for energy (EIA)



http://www.world-nuclear.org/nuclear-basics/greenhouse-gas-emissions-avoided.aspx

History

- 1950’s proposed to extract methane gas
- 1970’s received funding due to energy crisis
- Aquatic Species Program
  - 1980 to 1996
  - $25 million
- 1995 DOE Program Shut down
- “Peak Oil”
  - Genetically Engineered
  - Algae Biomass Organization

http://allaboutalgae.com/algae-basics-photos/

Challenges

- Developing large-scale, cost-friendly farms/refineries
- Increasing efficiency and productivity using different algae strains/techniques
- Many years from hitting the commercial market (Exxon-Mobil)
- Need for governmental support/possible enforcement
- Maximizing production and reducing cost (WesternFarmPress)

http://i.bnet.com/blogs/biofuel_green_algae_tubes_flickr_jurvetson_500px.jpg

Future Research

- Predicted: Up to 20,000 gallons of oil per acre (Oilprice)
- Lowering cost of production
- Mass production with large bioreactors
- Petroleum-algae oil blend (Algae Holds Tremendous Promise for Biofuels Future)
- Government support from US Department of Energy (Crude Farm to Produce Algae-Based Oil)

http://www.climatetechwiki.org/sites/climatetechwiki.org/files/images/extra/micro-algae_photobioreactor.jpg

Closing

- Algae based fuels help to greatly reduce the need for fossil fuels
- Genetic engineers are working to make algae technology more affordable
- The use of bioreactors could help with mass production
- Algae is a much more efficient plant to extract biofuel from than typical sources
- Increased government funded research would expedite this technology.

https://upload.wikimedia.org/wikipedia/commons/thumb/b/ba/Photobioreactor_PBR_4000_G_IGV_Biotech.jpg/220px-Photobioreactor_PBR_4000_G_IGV_Biotech.jpg

And Remember...

http://img3.wikia.nocookie.net/__cb20141121055907/spongebob/images/5/52/The_Algae%27s_Always_Greener.jpg

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Questions?