U.S. Jet Fuel Production Potential from Wastes

Summation: Wet wastes, FOGs, MSW, Ag & Forestry Residues, and Industrial Gases

Wet Wastes (HTL): 3.8 Billion gpy
FOGs (HEFA): 0.8 Billion gpy
MSW (FT): 3.1 Billion gpy
Agriculture Residues (FT): 6.1 Billion gpy
Forestry Residues (FT): 0.4 Billion gpy
Industrial Gases (ATJ): 1.3 Billion gpy

Current Total Potential ~ 15.6 Billion gallons of jet fuel per year

(approx. 59% of 2018 U.S. demand)

This is a working document and subject to change.

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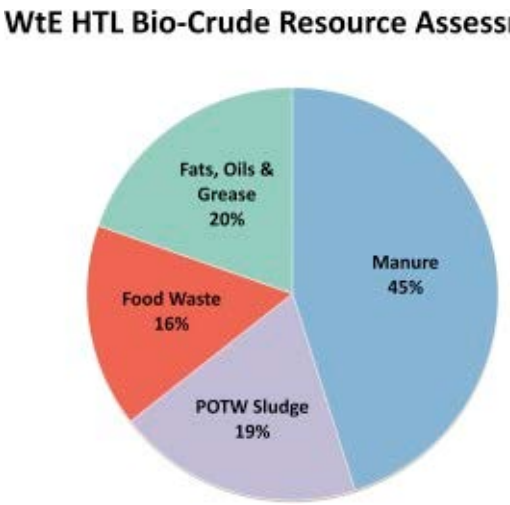
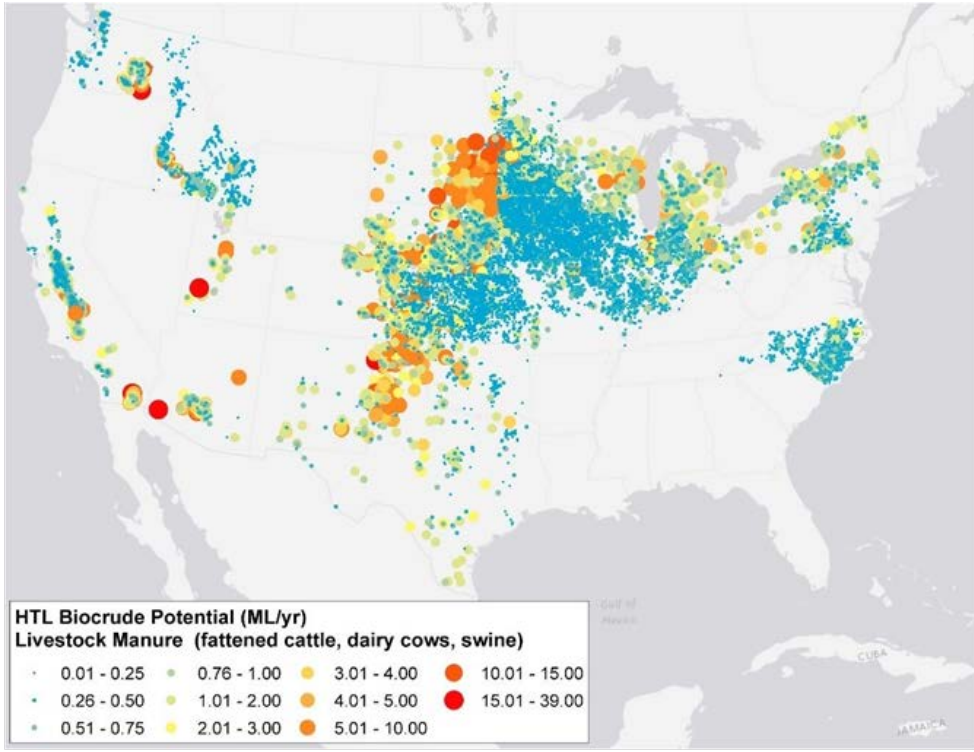
U.S. Jet Fuel Production Potential from Wastes
Wet Wastes – converted, e.g., via HTL

3.8 B gpy*

* Animal manure - 2.7 B gpy
* Wastewater sludge - 1.1 B gpy





*Removed FOGs and Food Waste from jet fuel calculation – FOGS assumed to go to HEFA and food waste to MSW/FT
Assumes a nearly 100% conversion rate from biocrude to jet fuel

Source: Waste-to-Energy biofuel production potential for selected feedstocks in conterminous United States, Skaggs, et al.

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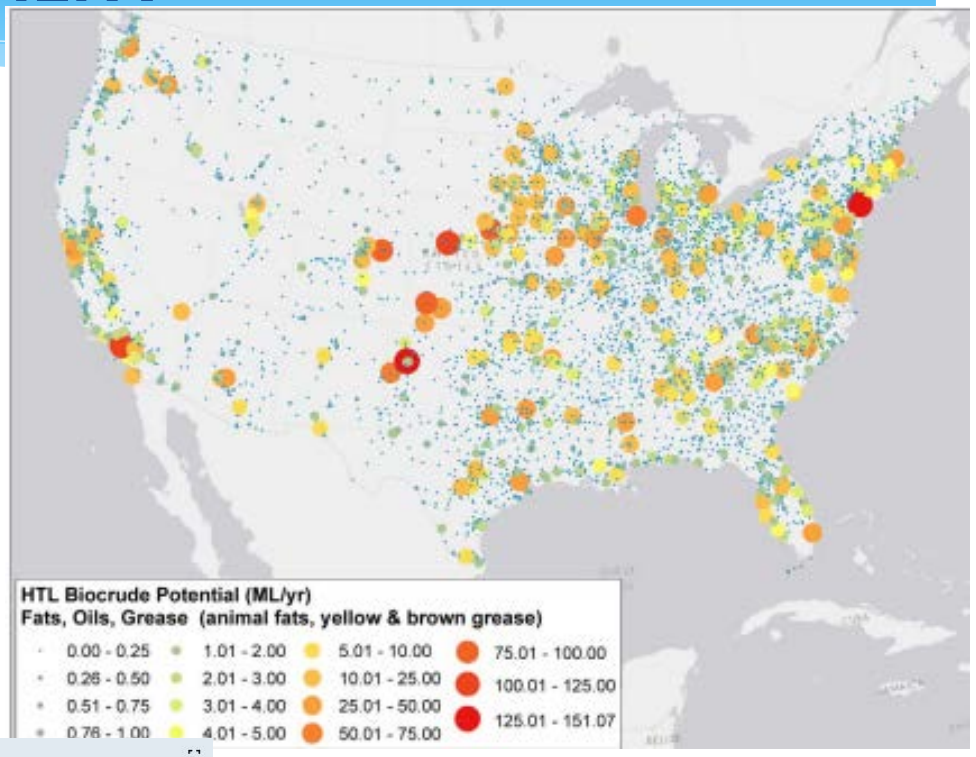
U.S. Jet Fuel Production Potential from Wastes FOGs– converted, e.g., via HEFA

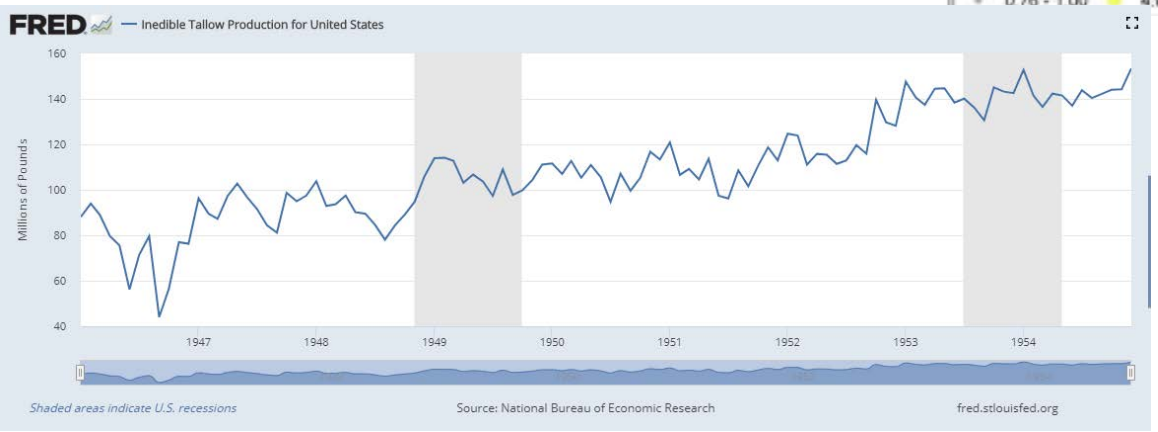
823 M gpy*

(estimates vary)

* Inedible fats, oils, and greases (FOGs) (5.92M short tons/y)



https://www.nrel.gov/docs/fy18osti/68470.pdf



https://fred.stlouisfed.org/series/M01218USM149NNBR

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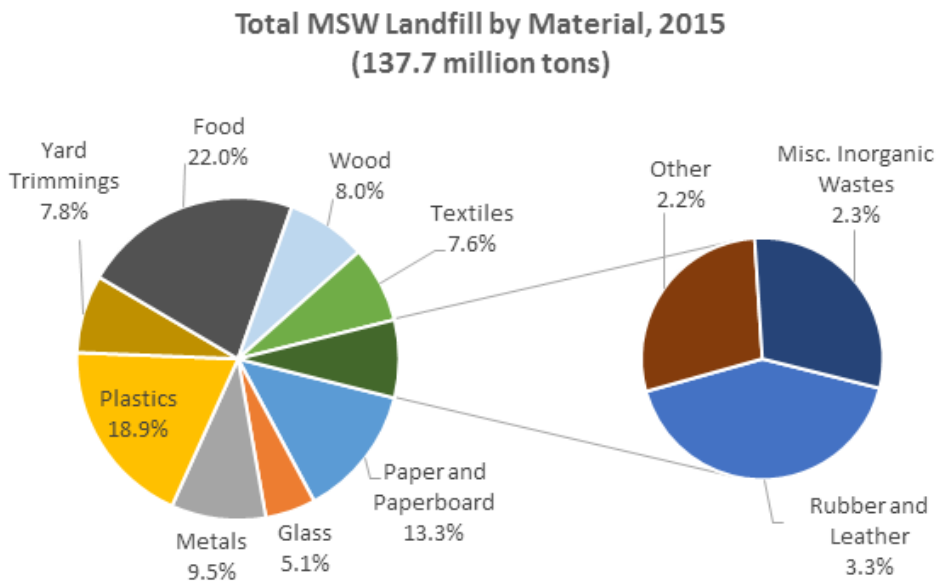
U.S. Jet Fuel Production Potential from Wastes

MSW – converted, e.g., via FT

3.1B gpy

* 137.7 million tons sent to landfill in 2015



Category	Potential Jet Fuel Production From Landfill (million gallons)
Paper	499
Wood	234
Food	332
Yard Trimmings	137
Plastics	1,527
Rubber, Leather, Textiles	733
TOTAL	**3,462***

*Assumes all landfilled wastes are recovered and utilized

https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/national-overview-facts-and-figures-materials

Galligan. CO_2 emissions reduction potential of aviation biofuels in US.

Staples et al. 2018 Aviation CO_2 emissions reductions from the use of alternative jet fuels

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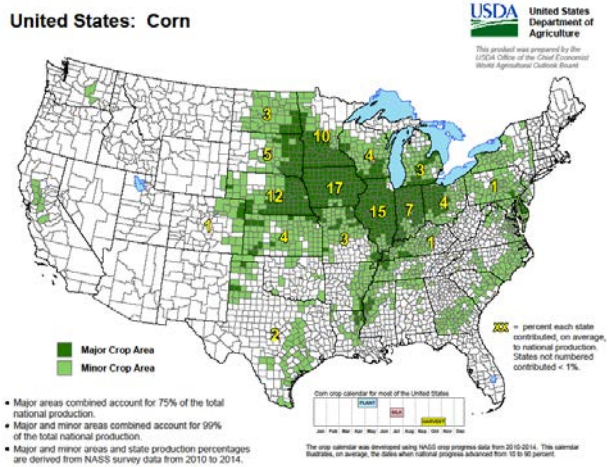
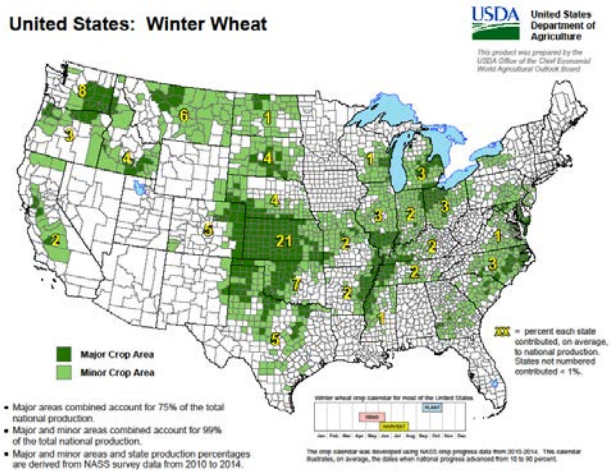
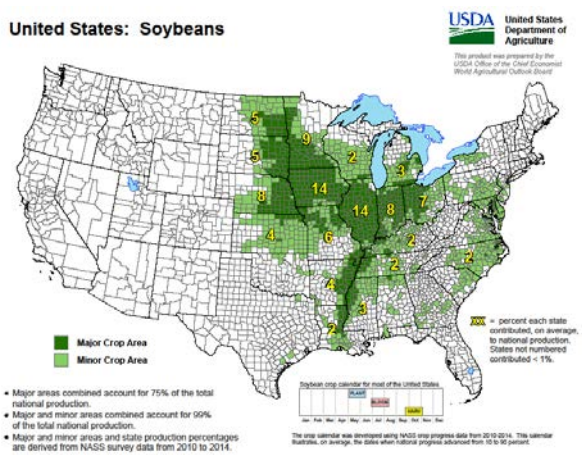
U.S. Jet Fuel Production Potential from Wastes Agricultural Residues – converted , e.g., via FT or ATJ

6.1B gpy

* Corn, wheat and soy 90% of cropland
* USDA 2019/2020 Projections for domestic production:
  * Corn 14,930 million bushels
  * Wheat 2,060 million bushels
  * Soy 4,090 million bushels







https://www.usda.gov/oce/commodity/projections/
https://www.usda.gov/oce/weather/pubs/Other/MWCACP/namerica.htm

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U.S. Jet Fuel Production Potential from Wastes
Forestry Residues – converted, e.g., via FT

381M gpy

* 70% of residues already diverted
* Total Unused Recoverable Residues = 15,334.362 thousand short tons

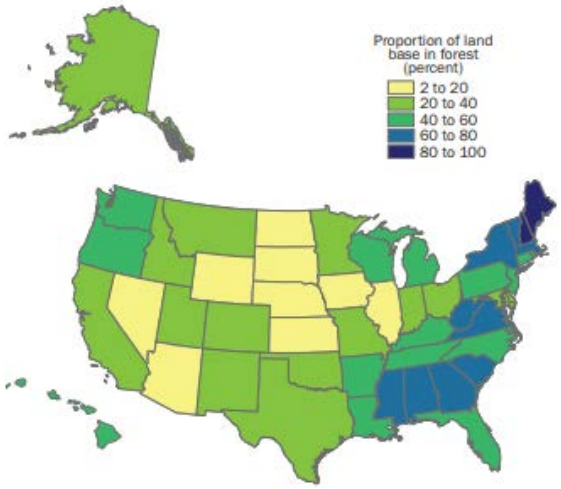

Figure 4. Percent of total land area that is forested, by State.

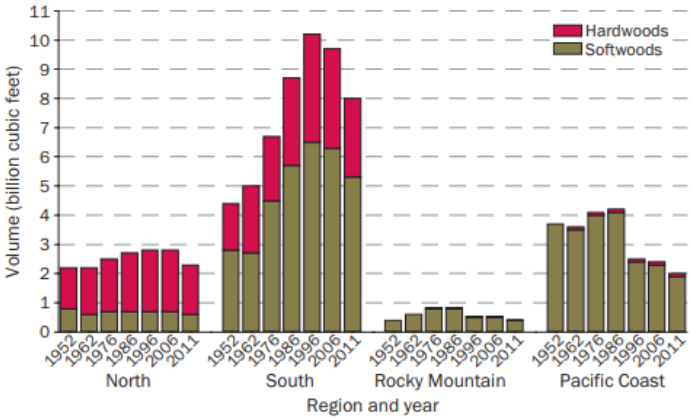

Figure 30. Growing-stock removals in the United States by species group, region, and year, 1952 to 2011.

https://www.fs.fed.us/sites/default/files/media/types/publication/field_pdf/GTR-WO-91.pdf

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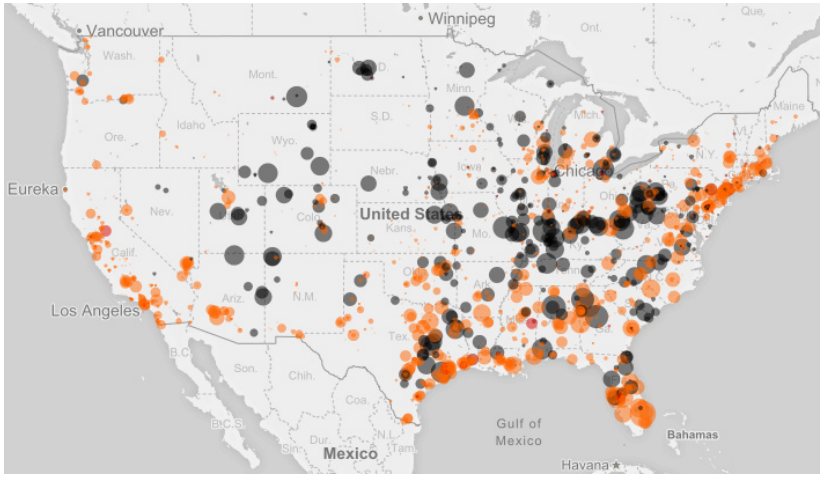
U.S. Jet Fuel Production Potential from Wastes

Industrial Gases – converted, e.g., via gas fermentation followed by ATJ

1.3B gpy*

* Steel Mills - 820M gpy
* Ferro-Alloy – 20M gpy
* Refineries – 500M gpy

Fossil Fuel Power Plants in the U.S.
Two most prominent sources are coal (black) and natural gas (orange)



https://www.visualcapitalist.com/mapped-every-power-plant-in-the-united-states/

* Communication with Dave Meyer, LanzaTech, August 5, 2019

https://www.ft.com/content/52552bf8-c024-11e9-89e2-41e555e96722

https://venturebeat.com/2012/01/23/lanzatech-raises-55m/

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For additional detail, please contact us at info@caafi.org

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