



The Impact of Biofuels on Sulphur Recovery

2021 Brimstone Virtual Vail Symposium
Thursday, September 16, 2021

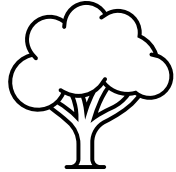
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Introduction

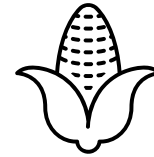


- What are biofuels, why are they important?
- Refining with biofuels
- Effects on the SRU
- Future work

Definitions

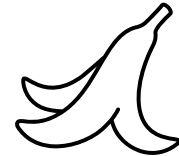
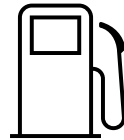


Biomass



First
generation

Second
generation



New announcements



Carbon & Sustainability Renewables

Massive oil refiners are turning into biofuel plants in the west

By Bloomberg Thursday, August 13, 2020, 6:37 AM MDT



ENVIRONMENT

Imperial Oil to produce renewable diesel at Strathcona refinery using locally grown crops

By Amanda Stephenson • The Canadian Press

Posted August 25, 2021 11:57 am • Updated August 25, 2021 5:10 pm

Global News Hour at 6 Edmonton

Imperial Oil to produce renewable diesel at Strathcona refinery using locally grown crops

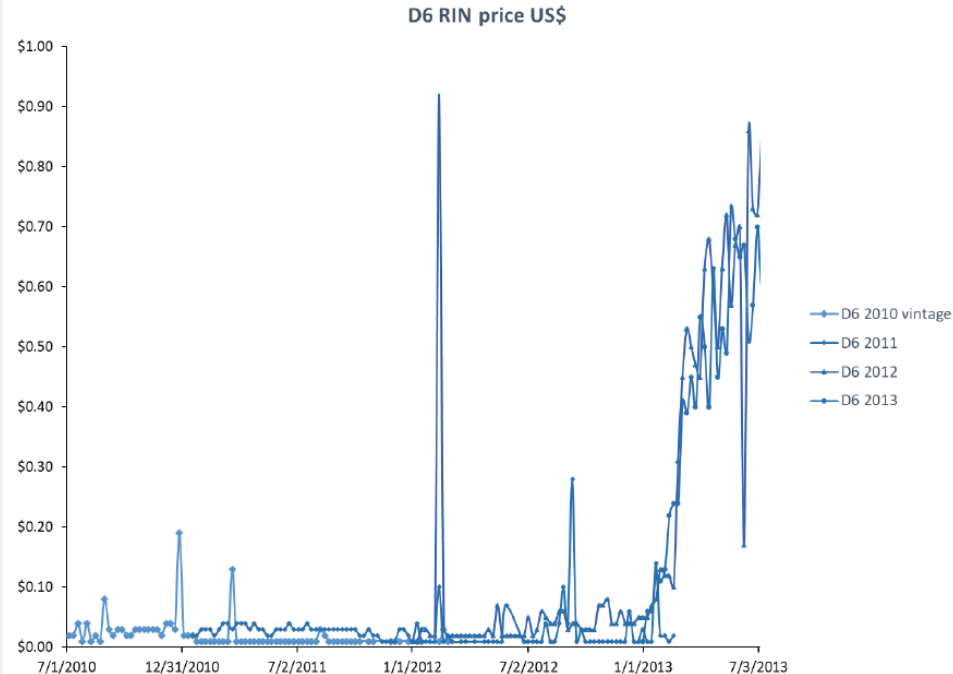


Acronyms



- RFS – Renewable Fuels Standard
- CI – Carbon Intensity
- RINs – Renewable Identification Numbers
- CFS – Clean Fuels Standard (in Canada)

2024-04-14

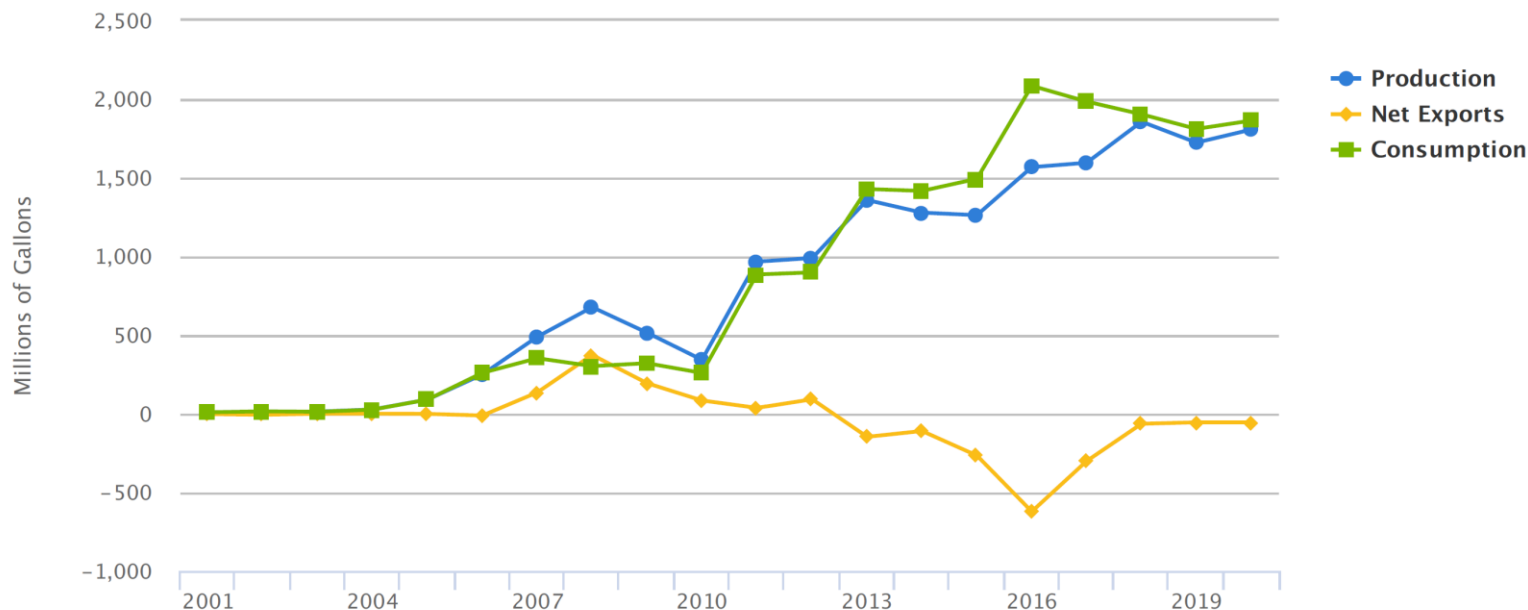


Visit sulfurrecovery.com for more information.

EIA reporting of biodiesel production



U.S. Biodiesel Production, Exports, and Consumption



Last updated: June 2021
Printed on: September 15

Biofuels effective for climate change?



FT

'Diesel vs doughnuts': new biofuel refineries stir up US food industry

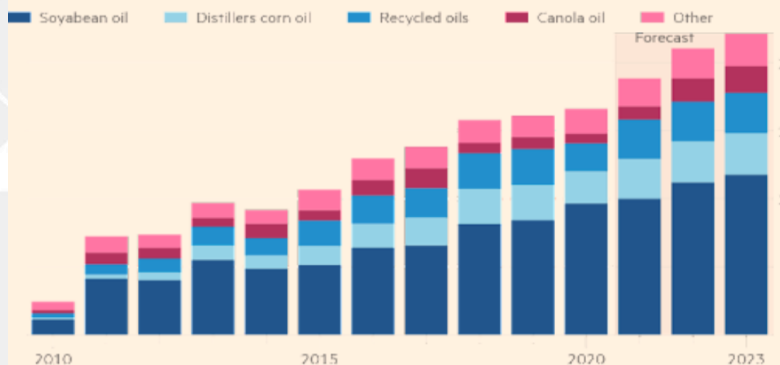
07-Sep-2021



A search for lower-carbon motor fuel is pitting food companies against the energy industry over tightening supplies of a humble commodity: vegetable oil.

Biofuels to drive up demand for edible oils

Feedstock for US biodiesel and renewable diesel, by feedstock (bn lb)



2021 to 2023 are forecasts
Source: StoneX
© FT

Biden Outlines a Plan for Cleaner Jet Fuel. But How Clean Would It Be?

Some biofuels may contribute to greenhouse gas emissions in ways that can significantly reduce, and sometimes offset, their advantages over fossil fuels, studies have shown.



Globally, 140 billion tonnes of biomass are generated every year from agriculture

Agricultural wastes refer to the residues from the growing, harvesting and processing of raw agricultural products such as grains, fruits, vegetables, fish, meat, poultry, dairy products, etc. They are the non-product outputs of production and processing of agricultural

- Tallows vs. new oils vs. used cooking oils
 - What is the raw material qualities?
- Co-processing versus renewable diesel
 - Projects proposed are 100% renewable
 - Co-processing doesn't mean your existing equipment will work

Impact on refining (cont'd)



- Catalyst selection
- Operation modes
- Hydrocarbon carryunder
- Understanding feed source
- Blending into finished product

Effect on SRU – Amine Acid Gas



Compound [mol%v, dry]	Renewable Diesel	Typical Refinery
CO2	96.2597	2.8902
H2S	3.1209	95.4604
C1	0.1305	0.0097
C2H4	0.0687	0.0000
C2H6	0.0024	0.0057
C3	0.3511	0.0015
iC4	0.0135	0.0009
nC4	0.0083	0.0010
C4 (olefins)	0.0005	0.0000

Effect on SRU – Amine Acid Gas (cont'd)



Compound [mol%v, dry]	Renewable Diesel	Typical Refinery
Benzene	0.0006	0.0325
Toluene	0.0085	0.0230
Ethyl Benzene	0.0003	0.0017
p-Xylene	0.0002	0.0011
m-Xylene	0.0004	0.0035
o-Xylene	0.0006	0.0007

Effect on SRU – higher HCs in SWAG



Compound [mol%v, dry]	Co-process tallow	Typical Refinery
CO2	2.2689	0.1552
H2S	40.7485	44.9323
NH3	56.3272	47.9379
C1	0.0721	0.0077
C2H4 + C2H6	0.1579	0.0041
C3	0.0674	0.0008
iC4	0.0127	0.0002
nC4	0.0648	0.0007
C4 (olefins)	0.0043	0.0000

Effect on SRU – high turndown



- Retrofit of European refinery to biofuels
- Acid gas quality went from 62mol%v to 12mol%v H₂S
- Project achieved
 - Operation of SRU under new AAG quality
 - Increased capacity of 20% after solving foaming issue due to biomass

- What are your concerns?
- What data would you like to see?
- Ideally, come back next year Vail with data

Thank you



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