



The Jacobsen Feedstock  
Conference  
Denver 2021



# The Brief History of Biofuel

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Ethanol

Biodiesel

Renewable Diesel

Sustainable Aviation Fuel (SAF)



# How is this all going to work?

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## ➤ Necessity is the Mother of Invention

“Today's ethanol industry began in the 1970s when petroleum-based fuel became expensive and **environmental concerns involving leaded gasoline created a need for an octane replacement for MTBE**. Corn became the predominant feedstock for ethanol production because of its abundance and ease of transformation into alcohol.”

“In the 1850s, ethanol was a major lighting fuel. During the Civil War, a liquor tax was placed on ethanol to raise money for the war. The tax increased the price of ethanol so much that it could no longer compete with other fuels such as kerosene. Ethanol production declined sharply because of this tax, and production levels did not begin to recover until the tax was repealed in 1906.”

“In the 1970s, interest in ethanol as a transportation fuel was revived as oil embargoes, rising oil prices, and growing dependence on imported oil increased interest in alternative fuels. Since that time, ethanol use and production has been encouraged by tax benefits and by environmental regulations that require cleaner-burning fuels.”



# Necessity is the Mother of Invention

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- Across the last 20 years we have seen the emergence of the biomass based diesel market beginning with Biodiesel, Renewable Diesel following and now Sustainable Aviation Fuels the next frontier.
- Is this trend **NECESSARY?**
- The existing and now proliferation of low carbon fuel schemes as evidenced in Europe, US, Canada and now across the globe suggests **YES**



# Snapshot of Recent News

## Valero

- \$248 million of Renewable Diesel Q2 earnings
- \$99 Million of Ethanol Q2 earnings
- \$349 million of Oil Refining Q2 earnings
- St. Charles is expected to increase renewable diesel production capacity by 400 million gallons per year, remains on budget and is still on track to be completed and operational in the middle of the fourth quarter of 2021.
- The expansion will also provide the capability to market 30 million gallons per year of renewable naphtha into low-carbon fuel markets.
- Also going to produce SAF

## PBF

- To use its Ecofining technology for a potential renewable diesel project at its Chalmette Refinery in Louisiana. (Honeywell)
- Currently evaluating the conversion of an idle hydrocracking unit at the plant to a single-stage Ecofining unit that if built would produce 20,000 barrels per day of renewable diesel fuel.

## CVR

- Pausing plans to produce around 7,000 barrels per day of renewable diesel at its Wynnewood, Oklahoma, refinery due to high feedstock prices. Also, Coffeyville plant plans to take a pause.
- Plans to build a pre-treatment unit, expected to be complete in the third quarter of 2022, to be used for bean oil when the plant does start producing renewable fuels.



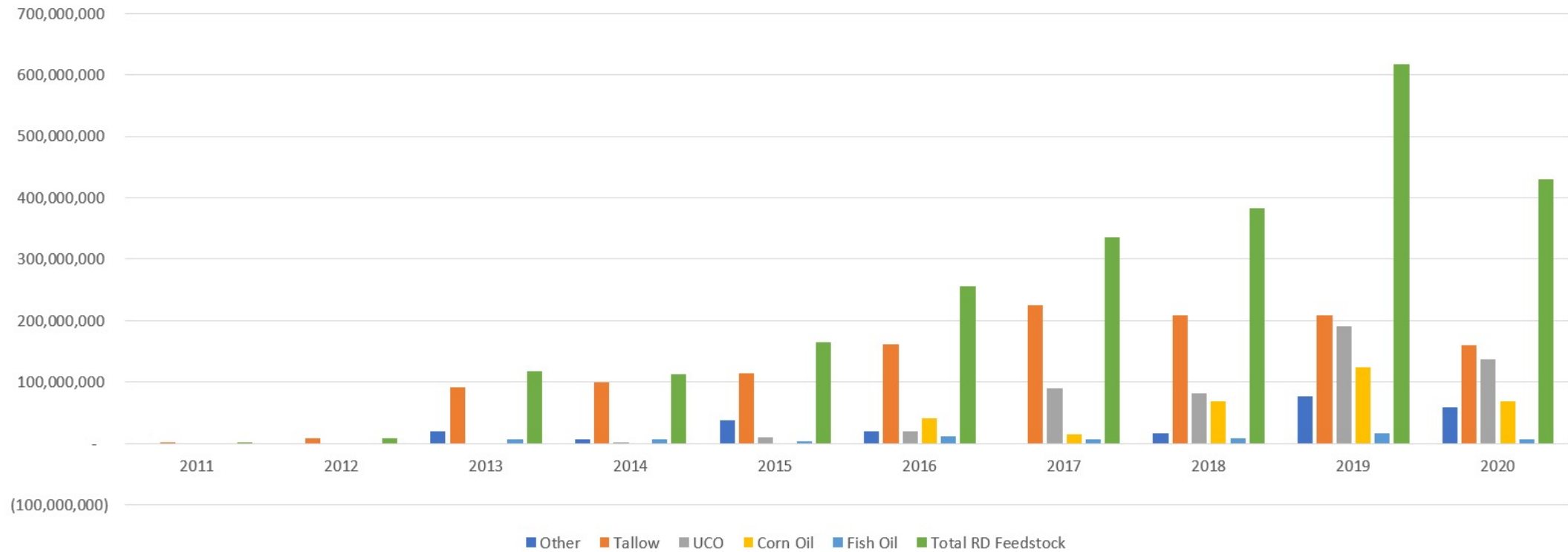
# **Where will the feedstock come from?**

**The Jacobsen Conference August 2021**



# Low CI Feedstocks into CA LCFS

RD Feedstock (2011-3Q20) - CARB  
Tallow, UCO, Corn Oil, Other, Fish Oil Volume



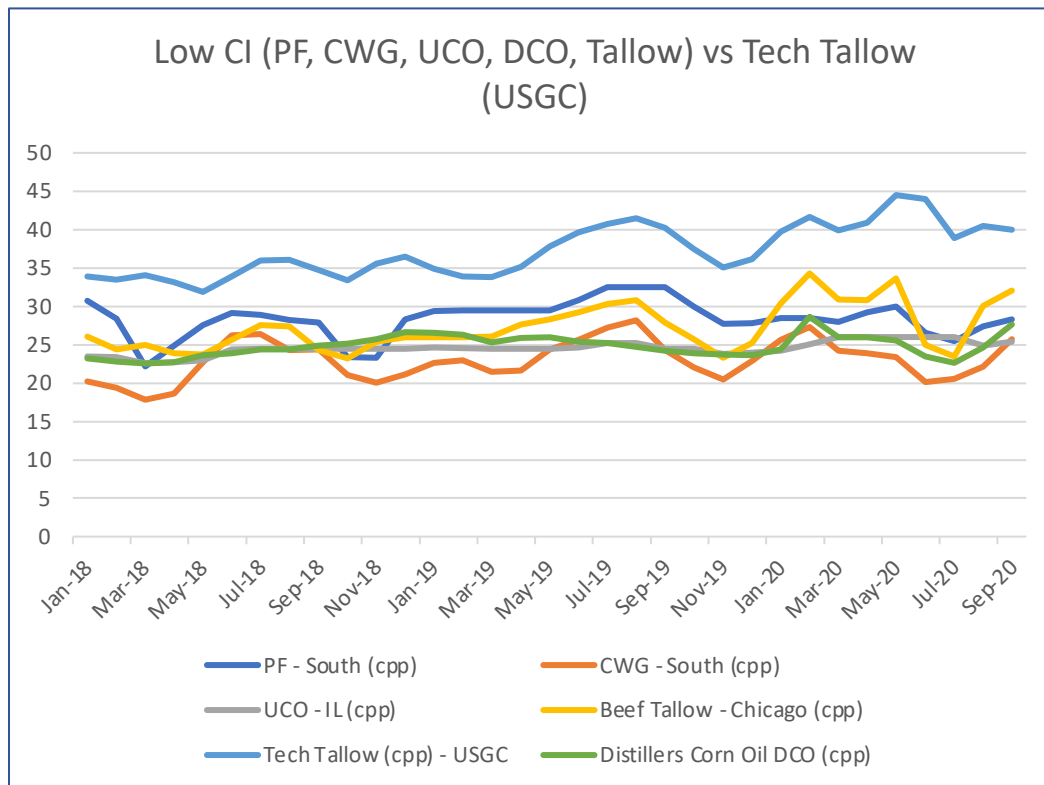
Source: The Jacobsen



# Low CI Feedstock Opportunity

Widening spreads are creating a market opportunity for pretreatment

## Historical Feedstock Prices



## Insights

- Spreads between highly refined “Technical” grade and crude grades are increasing. We expect Poultry and CWG will follow based on their similar “Carbon Intensity” values
- Demand for highly refined fats and waste oils will increase significantly as most refinery conversions will not include robust feedstock pretreatment capabilities

### Obvious US Market Opportunities:

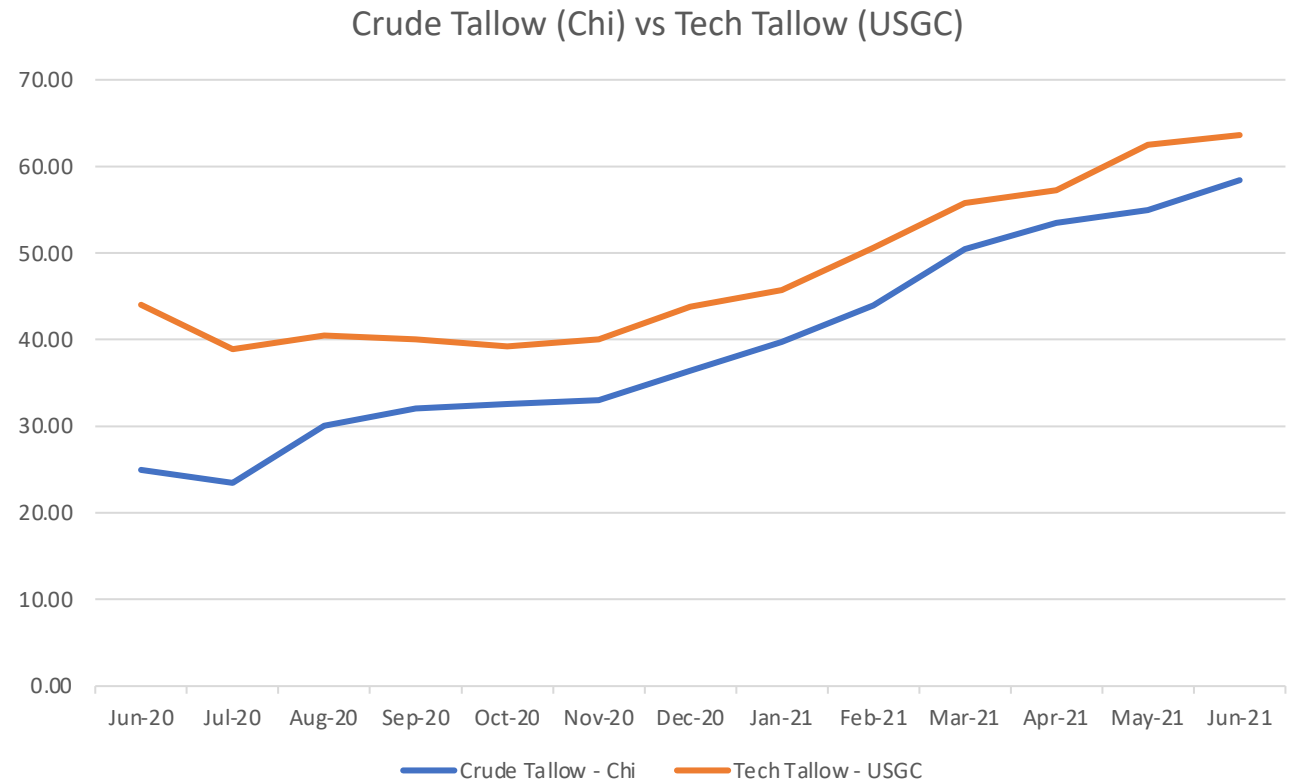
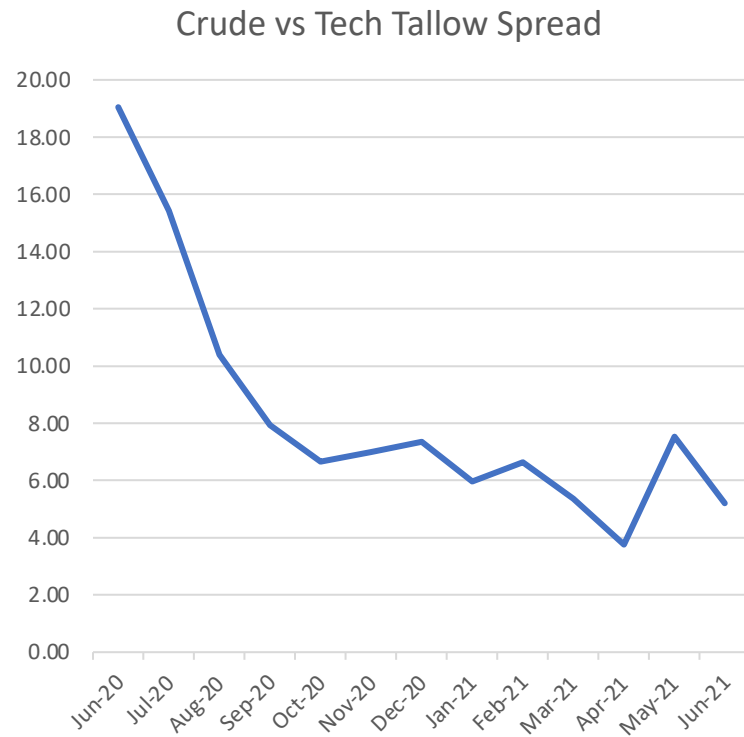
- Approximately 30% of Choice White Grease (CWG) presently sold into fuel demand
- Approximately 20% of Poultry Fat presently sold into fuel demand





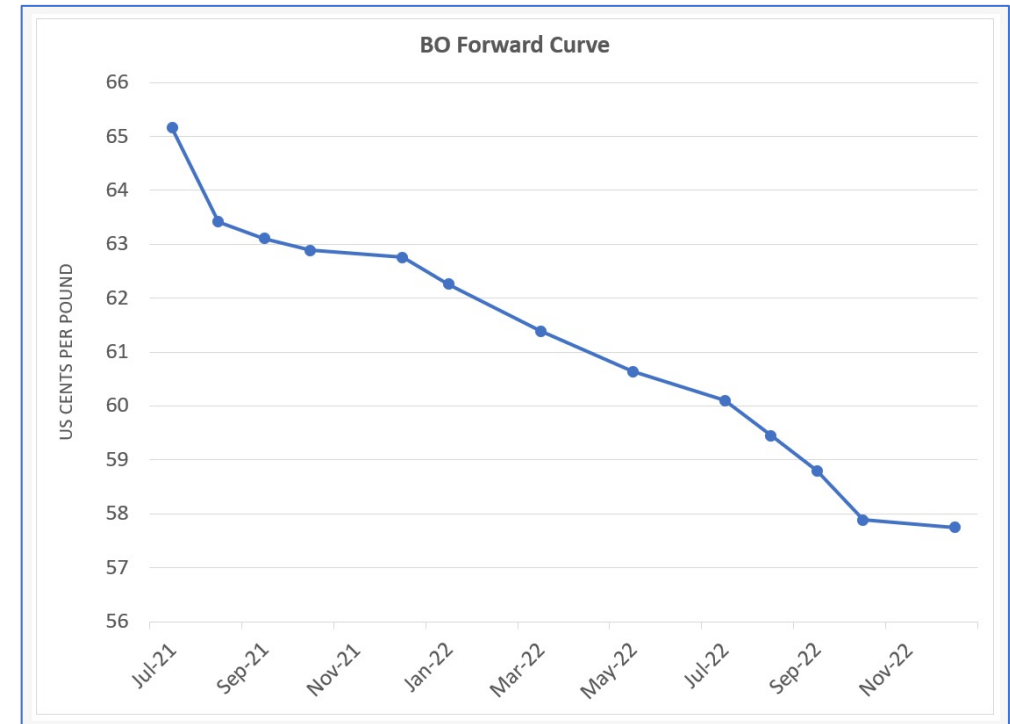
# Crude Tallow (Chi) vs Tech Tallow (USGC)

Technical Grade Tallow is the precedence to gauging how ALL animal fats will move towards fuel production





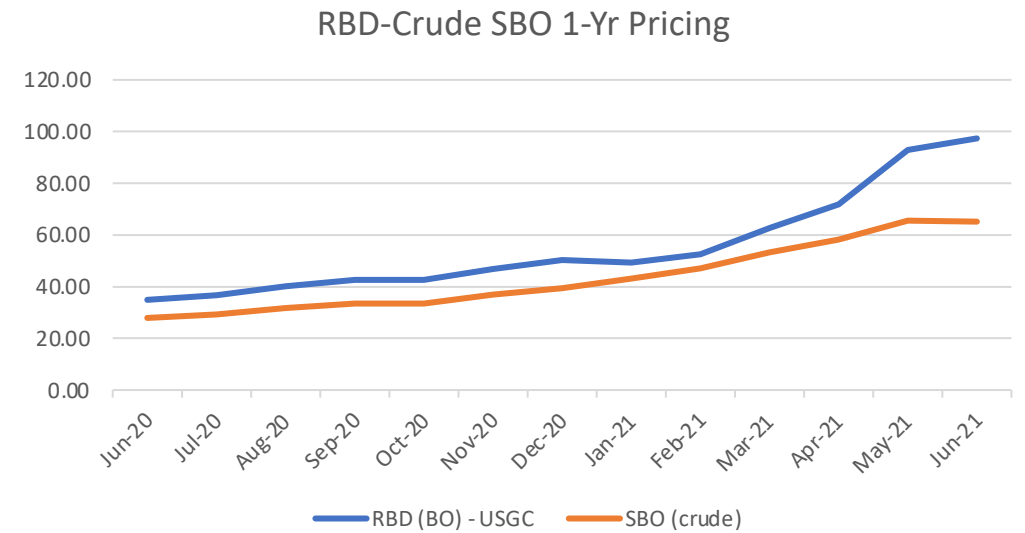
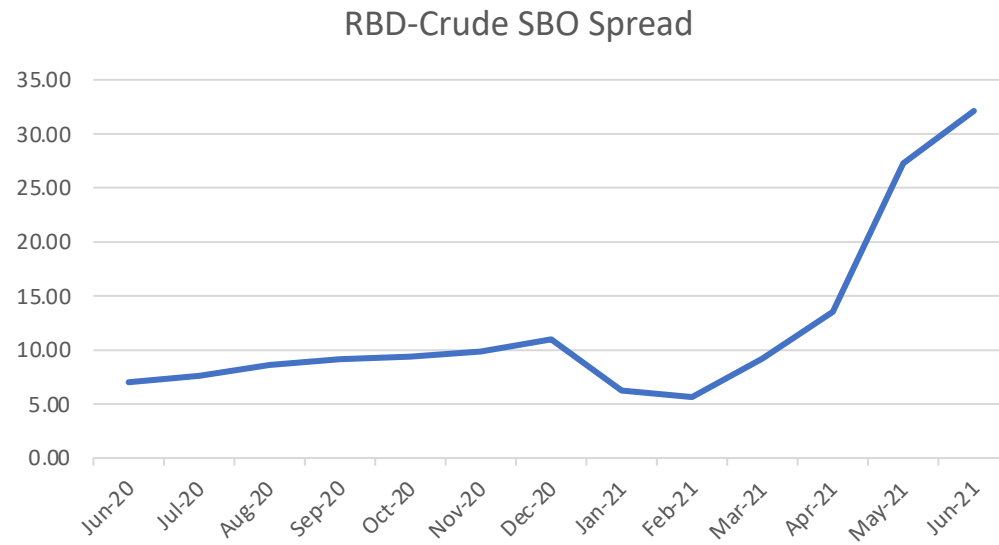
# Soybean Oil Market Update



- 2020/2021 crop year is shaping up to be one of the tightest soybean oil markets in history
- BO futures at all-time highs in June; market heavily backwardated
- Strong exports of soybeans to China will cause crush rates to slow in the US in Q3
- Demand for soybean oil from renewable diesel plants is ramping up as projects come online
- Refiners are eager to find new sources of feedstock



# RBD vs Crude SBO Spread & Pricing (1-Yr)





# Crude to RBD Soybean Oil

RBD Soybean Oil Premium

(Source: The Jacobsen)



- RBD (Refined Bleached Deodorized) soybean oil is trading at 37 cent/lb premium to BO futures which is more than 50% of the base commodity price
- US is short refining capacity as evidenced by the blow out in the spread. An estimated 18.5 B LBs of capacity exists, but much of it is dated, in small vo and not able to logistically ship unit trains to RD/SAF refineries
- Primary driver for move up in the spread is the entry of renewable diesel producers looking for oil with low metal content
- "RBD" is the closest fit today however more specialized "RD/SAF specifications will soon prevail



# The Next 5 Years

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- 1) Feedstocks will continue to move from Biodiesel production to Renewable Diesel production as the cost curve has already become established across the past few years for these two products competing for the same feedstocks
  - The California LCFS market is Exhibit A of this trend in motion
- 2) The EPA will grant a RFS2 pathway for Canola Oil for Renewable Diesel production in creasing the availability of RBD or low metals Virgin Vegetable Oil to the Renewable Fuel producer.
  - This is not and IF it is simply a WHEN
- 3) CARB will grant CI values for Camelina per the EPA's designation of this feedstock as a cover crop and Soy and Canola farmers in the US and Canada will begin to grow the first "next Generation" oil seed crop for renewable fuels production
  - This is not an IF but simply a WHEN and will begin the race for next gen crop oils



# The Next 5 Years

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- 4) INNOVATION across the board is coming with Carbon Intensity “architecture” now driving EVERY decision
- **The California LCFS market is Exhibit A of this trend in motion clearly establishing the needs of the industry to serve this large-scale demand coming at is for low carbon fuel refining**
  - **All feedstocks will see processing innovation, it has already begun. As we have seen with ARA technologies, new to the agriculture and oleochemical world proven technology form the oil and gas world will continue to migrate this way to provide solutions.**
  - **New campuses will be built that may included much broader optionality than what we have seen in the past. Rendering and pretreatment in the same location. Crush and vegetable oil refining with expanded capabilities to manage new crops such as Camelina always with an eye towards lower carbon intensity scoring.**



# The Next 5 Years

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## 5) Hedging Instruments:

- **A new market maker named Stable is using The Jacobsen data to recently launch “Call and Put” Options for a growing list of these products and markets. See David Becker’s presentation for more information here!**
- **Existing and new exchanges are all working on new hedging instruments to begin to give market participants the tools necessary to begin to buy forward as this market is increasingly demanding**



# The Next 10 Years

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- The Crop Sciences Industry will begin to develop high oil yield crops that can be grown on non-food competitive acreage that require low water and fertilizer utilization

## **Exhibit B - Agrisoma Carinita bought out by Nuseed**

“Nuseed develops unique canola, sorghum and sunflower plant traits for high yields, and novel oils and proteins with specific consumer benefits. Through their unique identity preserved programs Nuseed is also creating new value and markets”

“Years of research and development have maximized carinata’s agronomic, non-food low carbon renewable fuel feedstock and high protein non-GMO meal performance. Proprietary Nuseed Carinata grown as a cover crop is independently RSB certified, proven to provide best in class greenhouse gas reduction. Carinata’s carbon sequestration also substantially improves soil health. Demand by biofuel processors is growing rapidly and increasing contract opportunities for growers. Nuseed’s contract production is initially focused in Argentina.”





# The Next 10 Years

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## **Exhibit B - Agrisoma Carinita bought out by Nuseed**

- The proprietary renewable feedstock is certified by the Roundtable of Sustainable Biomaterials (RSB) for the European Renewable Energy Directive (RED) standard.
- It offers a solution to market leaders seeking feedstocks that deliver maximum GHG reductions in their renewable fuel use.
- A co-product of crushing Carinata to extract the non-food oil is a high protein, non-GMO meal for animal feed.
- The Carinata team's dedicated research, regulatory, business development, and plant breeding experts are working with Nuseed global regions in South America, Europe, Australia, and North America to maximize the crop for both our farm and end-use biofuels customers.
- By using the Nuseed Value Chain approach, we are collaborating with our agricultural networks to bring value to growers, industry partners, and biofuel processors.
- Nuseed is increasing production of Carinata over the next few years with a closed-loop contracting structure for farmers in major soybean growing regions, initially in South America.
- Sustainable agriculture practice incentives will be a priority for improved GHG reductions. Initial offtake partnering and supply chain optimization are underway with a focus on expansion and maximizing sustainability.



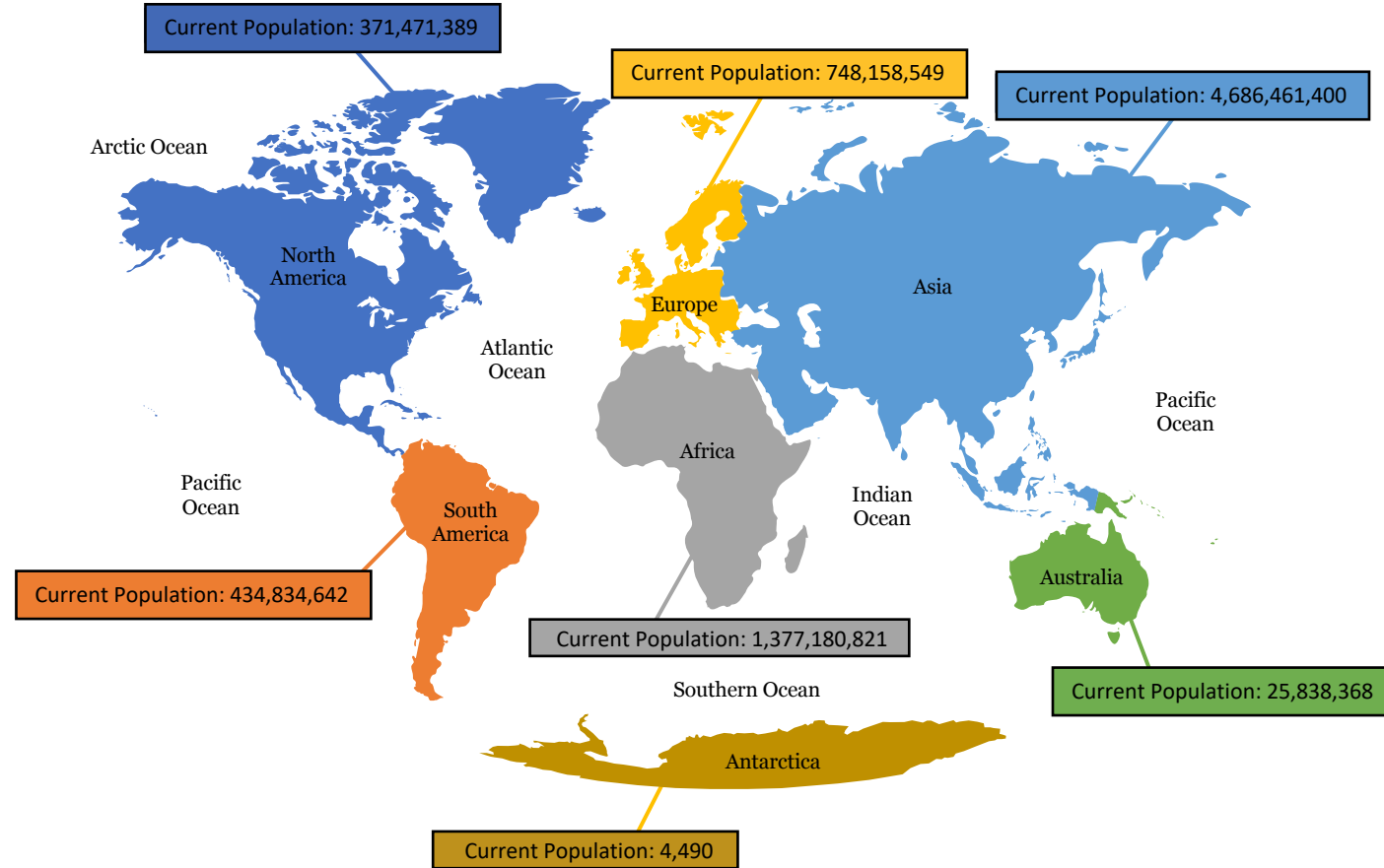
## The Next 10 Years

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- Used Cooking Oil will continue to be commoditized globally.
- Substitutes such as Palm Oil in the US and Canada has begun to replace UCO in historical demand markets such as the feed industry and this trend will continue globally



# The Next 10 Years





# The Next 10 Years (Animal Fats)

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➤ Beef, Poultry and Swine will continue to be dislodged from feed markets to fuel production

- ❖ Demand for “all veg diets” support this trend creating substitutions for the feed markets with higher CI value replacements such as Palm Oil in the North American market
- ❖ Beef Tallow given it’s “technical grade” pretreatment capacity will pave the way for other fats to begin to add similar pretreatment capabilities to reach these low metal, highly refined grades the market is demanding for



# Recent Feedstock Headlines

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- ADM and Marathon will form a Joint Venture (75/25%) at ADM's Spiritwood, North Dakota. The 600 million pound of annual
- Viterra Glencore Agri plans to build world's largest Canola crushing plant at Regina Saskatchewan end 2024 and the plant will crush up to 2.5M metric tons of canola per year
- Richardson International Limited adding to canola crush plant in Yorkton, Saskatchewan and Richardson recently invested capex in Lethbridge, Alberta crush plant
  - Yorkton capex plan to double processing capacity to 2.2 million MT by early 2024
  - Facility expansion includes shipping system with three 9,500-ft loop tracks (CN, CP)



# How do we provide farmers a substitute and free up the UCO and fats from the feed?

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**As we began to understand how to remove UCO and Fats away from the feed markets that have historically taken much of it as well as alternate demand markets we quickly began to see the most viable substitute.**



# 2021 Int'l Renewable Fuels Data Points

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## Global Renewable Fuels (RD & Biodiesel) 2021 Data Points

- U.K., Netherlands and Germany have pending mandate growth plans for their countries
- Neste Porvoo (Finland) completed major EUR630MM turnaround
- Neste has four prod'n lines, over 40 prod'n units at the 13.5M t/year Porvoo refinery including two NEXTBTL renewable diesel units
- Preem's Lysekil refinery has begun producing renewable gasoline
- Initial tests have begun at plant to produce fuel stream using pyrolysis oil delivered by Preem joint-owned subsidiary company Pryocell
- Preem long-term goal of producing 5M renewable fuels by 2030
- European UCOME market pricing based on FOB ARA with zero degrees CFPP, 87% GHG reduction and UK/NL double counting options
- Sweden plans to increase renewable fuel gasoline blending mandate to 7.8% start 2022
- Brazilian government (4/9) cut its biodiesel blending requirement to 10% from 13%