

## The Impact of Biomass-Based Diesel Capacity Expansion on Vegetable Oil Demand and Prices

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Soybean Oil Futures

- Soybean oil futures have risen to multi-year highs due to a combination of strong domestic and export demand and rising world vegetable oil prices
- The surge in coronavirus cases remains a downside risk, but governmental efforts to slow the virus are not likely to be as restrictive as they were during the first wave.
- In the next year, a large expansion in U.S. biofuel capacity will likely strain the supply of feedstock markets. Since soybean oil is the marginal feedstock, any shortfall in low CI supplies will drive additional domestic consumption.





Impact of coronavirus

#### 2020 Food Expendatures: Change from Five-Year Average

- The lockdowns to slow the spread of the virus caused an unprecedented shift in consumer behavior starting in March.
- Preparation for lockdowns caused a surge in spending for food at home that partially offset the decline in restaurant expenditures.
- The sharp decline in away from home spending in April resulted in a drop in total spending on food. However, total spending has recovered and rose over the summer.
- Colder weather in northern cities and restrictions on restaurant capacity could lead to a reduction in spending away from home and potentially total spending in the coming months.





#### U.S. Soybean Oil: Daily Average Biomass-Based Diesel Use

Source: EIA, EPA, The Jacobsen

# Impact of coronavirus

- Declines in ethanol production and slaughter, drove a sharp increase in soybean oil's percentage of total feedstocks for biodiesel production.
- Ethanol production has recovered from the lows. However, increasing adoption of work-from-home is expected to permanently reduce gasoline consumption and potentially U.S. ethanol production.

(million pounds per day)

• The impact of the pandemic should continue to support soybean oil's historically high percentage of the total feedstock mix in biodiesel production.



#### **Chinese Rapeseed Oil Prices**



**China Rapeseed Oil** 

- Flooding and political tensions between the Canadian and Chinese government has driven rapeseed oil prices sharply higher.
- The shortage of world vegetable oil supplies has made it difficult for Chinese buyers to rebuild inventories.
- Cash prices may also be influenced by Chinese futures, which have rallied sharply as the government has made it easier for speculators to invest in futures.





- The Jacobsen expects a substantial expansion in domestic renewable diesel capacity in 2021 and 2022.
- With output more than tripling from 2019, and producers favoring low CI feedstocks, it is unlikely the supply of fats and greases will be able to keep up with the expansion.
- The shortfall will leave vegetable oils to fill the gap. However, the expansion will test the supply of soybean oil, if the EPA does not approve a pathway for canola oil. Even with canola oil pathway, demand could exceed supply by the end of 2022.

## **U.S. Renewable Diesel Capacity**





 Expansion in coprocessing capacity is more modest, but still represents a substantial increase in feedstock demand.

## **U.S. Co-Processing Capacity**



## Feedstock Demand by Fuel Type



- The strong expansion of renewable diesel production capacity is expected to pressure biodiesel production margins.
- Falling margins and the potential expiration of the Biodiesel Blenders' Tax Credit (BTC) after 2022, could drive nonintegrated biodiesel producers to close.
- The development of export markets or largerthan-expected economic growth could limit the pressure on biodiesel producers.





### **Quarterly Non-Biofuel Vegetable Oil Usage**

- Non-biofuel use of all vegetable oils dropped from 20.9 pounds per person in the first quarter of 2020 below 17.5 pounds in the second guarter, which was the lowest total since 2012.
  - The Jacobsen expects strong demand from the biofuel industry and exports to keep nonbiofuel usage closer to the level in the second guarter than the trend before the pandemic.

(million pounds)





#### US Soybean Oil Export Commitments

- The narrow spread between soybean oil and palm oil is driving importing countries to switch from palm oil to soybean oil.
- Last week, India purchased 30,000 tonnes of U.S. soybean oil. Over the past year, monthly shipments from the U.S. to India have averaged less than 15 tonnes.
- Rising basis level could pressure U.S. exports, but expectations of tight palm oil stocks through the end of 2020/21, the spread between soybean oil and palm oil is not likely to widen.







- NOPA reported a record crush in October, driven by strong domestic soybean meal demand. However, the limited supplies will make it difficult for crushers to maintain volumes over the balance of the marketing year.
- The Jacobsen's assumptions about feedstock demand drive a need for soybean crush to climb to 2.3 billion bushels in 2021/22, from an expected 2.19 billion in 2020/21. There is some question about the ability for capacity to expand to meet this need.
- Even if crushers can meet the capacity, and there are sufficient soybean supplies available, refining capacity could be a bottleneck in the feedstock supply chain.



#### US VEGETABLE OIL FEEDSTOCKS SUPPLY AND DEMAND (million pounds)

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Beginning Stocks (January 1)	2,407	1,680	2,220	2,262	2,304	2,259	2,380	2,148	1,826
Production	23,686	25,325	26,815	27,320	29,600	29,578	30,552	31,543	32,333
Imports	3,687	3,908	4,516	4,696	4,209	4,405	4,464	5,062	5,151
Total Supply	29,780	30,913	33,551	34,277	36,112	36,243	37,396	38,753	39,310
Domestic Usage	25,676	26,009	28,357	29,015	31,012	31,303	31,970	34,287	35,852
<b>Biomass-Based Diesel Production</b>	7,345	7,295	9,442	10,298	12,182	12,681	14,230	18,020	20,856
Biodiesel Production	6,820	6,696	8,554	9,261	10,851	10,316	11,647	12,530	10,067
Renewable Diesel Production	493	580	871	1,018	1,307	2,352	2,558	4,802	10,077
Co-Processing Use	32	18	17	19	24	13	26	688	712
Non-Biodiesel Use	18,331	18,715	18,915	18,717	18,830	18,622	17,740	16,267	14,996
Exports	2,424	2,684	2,932	2,959	2,841	2,559	3,278	2,640	1,594
Total Use	28,100	28,693	31,289	31,974	33,853	33,862	35,248	36,927	37,446
Ending Stocks (December 31)	1,680	2,220	2,262	2,304	2,259	2,380	2,148	1,826	1,864

- Vegetable oil supplies are expected to be sufficient to meet the growing feedstock needs of the biofuel industry.
- However, the growing biofuel demand will require a reduction in non-biofuel usage and exports, especially in 2022.
- There is also a substantial risk that soybean crush volumes may not be sufficient to meet demand. At some point, oil share will likely need to rise to a level to drive crush volumes.
- Even if supply is sufficient, the historical relationship between stocks and prices will likely shift.



#### US FAT AND GREASE FEEDSTOCKS SUPPLY AND DEMAND (million pounds)

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Beginning Stocks (January 1)	299	310	212	197	215	233	233	255	233
Production	7,996	9,134	10,117	10,216	10,481	10,818	10,449	10,918	11,208
Imports	207	253	280	317	475	657	716	834	905
Total Supply	8,502	9,698	10,608	10,730	11,170	11,709	11,397	12,007	12,346
Domestic Usage	6,428	7,984	8,834	8,891	9,363	9,814	9,287	10,290	11,004
<b>Biomass-Based Diesel Production</b>	2,878	3,340	3,431	3,814	4,152	4,227	4,483	5,431	6,252
Biodiesel Production	2,030	2,378	2,212	2,628	2,885	2,432	2,163	2,393	2,477
Renewable Diesel Production	815	943	1,200	1,166	1,109	1,542	2,061	2,712	3,448
Co-Processing Use	34	20	18	20	159	252	259	326	328
Non-Biodiesel Use	3,550	4,643	5,403	5,077	5,210	5,587	4,805	4,859	4,752
Exports	1,764	1,502	1,578	1,624	1,574	1,663	1,855	1,484	1,097
Total Use	8,192	9,486	10,411	10,515	10,937	11,476	11,142	11,774	12,101
Ending Stocks (December 31)	310	212	197	215	233	233	255	233	245

Unlike vegetable oils, fat and grease feedstock usage will likely be constrained by supply.

The Jacobsen predicts rising U.S. imports, but any shortfall from The Jacobsen's forecast will raise the pressure on vegetable oils to meet demand.

 If prices rise sufficiently, exports could be more constrained than reflected in The Jacobsen's projections.



## **Biodiesel Production Outside the United States**



- Biodiesel production outside the U.S. is also expected to grow, potentially limiting the availability of low CI feedstock imports.
- There is some risk that biodiesel production could fall, especially if mandates in Malaysia and Indonesia are reduced.
- The Jacobsen expects growth in China to be limited by the adoption of electric vehicles.

## Biodiesel Production Outside U.S.



- Palm oil is the primary feedstock used outside the U.S. but the risk to mandates in Malaysia and Indonesia could reduce usage.
  - Soybean oil usage is substantial but steady. The Jacobsen expects growth in vegetable oil feedstock demand to be minimal through the end of 2022.
  - UCO and animal fat usage is relatively low but is likely to grow faster than other categories due to the favorable treatment under renewable fuel programs, especially in Europe.

## Feedstock Demand Outside U.S.



## Soybean Oil Futures Trading Range Forecast 42.00 41.00 40.00

39.00 0 (cents per pound) 38.00 0 37.00 0 36.00 35.00 — The Jacobsen Forecast High/Low 34.00 Ourrent Futures Prices 33.00 32.00 Dec-20 Jan-21 Mar-21 May-21 Aug-21 Sep-21 Oct-21 Jul-21 **Reference Contract Month** 

**Soybean oil forecast** 

- Soybean oil futures have been extremely volatile over the last 2 1/2 months, rising or falling by more than one cent in eight of the last 10 weeks.
- Downside price risk is due to falling soybean futures. However, if Brazilian production is below expectations or U.S. acreage in 2021 is not sufficient to raise soybean carryout, downside risk could be limited.
- The most significant downside price risk would be a change in U.S. biofuel policy.



## **Palm Oil Futures Trading Range Forecast**



- Concerns about falling production and tight inventories have driven palm oil futures to multiyear highs.
- The sharp decline in palm oil stocks in 2020 and robust demand from China, narrowed the spread between soybean oil and palm oil to parity. At parity, many importing countries will switch to soybean oil, which could drive U.S. exports above expectations.
- The most significant downside price risks are a change in biofuels policy and greater-thanexpected production.

## Palm oil forecast





**Canola oil forecast** 

### Chicago Canola Oil Trading Range Forecast

- The Jacobsen expects the spread between canola oil and soybean oil to remain close to the long-term average in 2021. However, it could be substantially higher if the EPA approves a pathway for renewable diesel.
- Canadian crush is expected to match last year's record but tightening stocks and strong export demand could limit canola oil supplies.
- Downside price risks include bumper Canadian crop, sharp decline in world vegetable oil prices, and changes in U.S. biofuel policy.



Learn more about our tracking of the conversion to renewable fuels and the impact on feedstocks

Click Here to Be Redirected to the Renewable Fuels Watch Section of the Jacobsen

