Updated on 10/13/2025 with changes to values on pages 3, 4, 25, and 28

CARB LCFS FUEL PATHWAY REPORT

RENEWABLE DIESEL

Prepared For:

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EXECUTIVE SUMMARY

The California Air Resources Board approved the original LCFS regulation in April 2009 as a discrete early action measure under the California Global Warming Solutions Act of 2006 (AB 32). In addition, the Board subsequently approved amendments to the LCFS in 2011, 2015, and in late 2018. For 2019 CARB has developed new, simplified calculators for determining the CI of transportation fuels. The new calculator for biodiesel and renewable diesel is much more flexible than the CA GREET 2.0 Tier 1 calculator. The new calculators are required to be used from January 1, 2019 and by the beginning of 2021 all plants were required to resubmit applications.

The calculator presents the CI for multiple feedstocks simultaneously. It also presents a CI for naphtha and renewable jet fuel that are co-produced with the renewable diesel. The calculator does require input data in a different format than the previous CA GREET 2.0 Tier 1 and Tier 2 calculators.

Phillips 66 Company ("Phillips 66") began production of renewable diesel fuel at its Rodeo Refinery in April 2021. In 2024, the petroleum refinery ceased production and two units were converted to also produced renewable diesel, renewable jet fuel and renewable naphtha. The new facility can process more feedstocks than the original facility.

This report accompanies a CARB Provisional Application for a Carbon Intensity determination for the products produced by the plant.

The emissions calculated for the individual stages are summed to determine the fuel cycle CI. The results for the Phillips 66 renewable diesel pathways are shown in the following tables. There are seventeen pathways in total. The vegetable oil pathways are shown in the first table.

Table ES- 1 Lifecycle GHG Emissions – P66 Vegetable Oil Renewable Diesel

Feedstock	Soybean Oil - Rail	Argentinian Soybean Oil	Canola Oil	Corn Oil
Stage	gCO_2e/MJ			
Feedstock Production	[redacted]	[redacted]	[redacted]	[redacted]
Fuel Production	[redacted]	[redacted]	[redacted]	[redacted]
Indirect Land Use	29.10	29.10	14.50	0.00
Tailpipe Emissions	0.76	0.76	0.76	0.76
RD	**58.29**	**65.42**	**53.89**	**29.77**

The next two tables are for used cooking oil pathways.

Table ES- 2 Lifecycle GHG Emissions – P66 UCO Renewable Diesel

Feedstock	UCO Asia	UCO Malay/Indo	UCO China
Stage	gCO_2e/MJ		
Feedstock Production	[redacted]	[redacted]	[redacted]
Fuel Production			
Indirect Land Use	0.00	0.00	0.00
Tailpipe Emissions	0.76	0.76	0.76
RD	**26.70**	**31.51**	**30.36**

Table ES- 3 Lifecycle GHG Emissions – P66 UCO Renewable Diesel

Feedstock	UCO North America	UCO South America	UCO Oceania
Stage	gCO_2e/MJ		
Feedstock Production	[redacted]	[redacted]	[redacted]
Fuel Production	[redacted]	[redacted]	[redacted]
Indirect Land Use	0.00	0.00	0.00
Tailpipe Emissions	0.76	0.76	0.76
RD	**23.44**	**25.23**	**28.70**

The next two tables are for tallow pathways.

Table ES- 4 Lifecycle GHG Emissions – P66 Tallow Renewable Diesel

Feedstock	Tallow North America	Tallow Europe	Tallow Africa	Tallow Asia
Stage	gCO_2e/MJ			
Feedstock Production	[redacted]	[redacted]	[redacted]	[redacted]
Fuel Production	[redacted]	[redacted]	[redacted]	[redacted]
Indirect Land Use	0.00	0.00	0.00	0.00
Tailpipe Emissions	0.76	0.76	0.76	0.76
RD	**33.85**	**37.26**	**44.28**	**42.51**

Table ES- 5 Lifecycle GHG Emissions – P66 Tallow Renewable Diesel

Feedstock	Tallow Oceania	Tallow South America	Tallow Brazil
Stage	gCO_2e/MJ		
Feedstock Production	[redacted]	[redacted]	[redacted]
Fuel Production	[redacted]	[redacted]	[redacted]
Indirect Land Use	0.00	0.00	0.00
Tailpipe Emissions	0.76	0.76	0.76
RD	**43.86**	**37.00**	**37.91**

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1. INTRODUCTION

The California Air Resources Board approved the original LCFS regulation in April 2009 as a discrete early action measure under the California Global Warming Solutions Act of 2006 (AB 32). In addition, the Board subsequently approved amendments to the LCFS in 2011, 2015, and in late 2018. For 2019 CARB has developed new simplified calculators for determining the CI of transportation fuels. The new calculator for biodiesel and renewable diesel is much more flexible than the CA GREET 2.0 Tier 1 calculator. The new calculators are required to be used from January 1, 2019 and by the beginning of 2021 all plants were required to resubmit applications.

The calculator presents the CI for multiple feedstocks simultaneously. It also presents a CI for naphtha and renewable jet that are co-produced with the renewable diesel. The new calculator does require input data in a different format than the previous CA GREET 2.0 Tier 1 and Tier 2 calculators.

Phillips 66 began producing renewable diesel fuel at its Rodeo Refinery in April 2021. This report accompanies a CARB Provisional Application for a Carbon Intensity determination for the products produced by the plant.

1.1 PHILLIPS 66 COMPANY

The Rodeo Renewable Energy Complex (RREC) is bordered by San Pablo Bay on the north and west, open land to the east and southeast, the Sunoco tank farm (formerly NuStar Energy) on the northeast, the Bayo Vista residential area of Rodeo to the southwest, and the residential enclave of Tormey, located east and adjacent to the Sunoco tank farm. Originally constructed in 1896, at which time the land was essentially vacant and agricultural, the Rodeo Refinery occupied 22 acres. During the second half of the twentieth century, it was expanded considerably as capacity and new processes were added and as vacant buffer zone land was acquired.

RREC comprises approximately 1,100 acres of land, but the Rodeo Site, where the main components of the Project took place, is the 495-acre developed portion of the property northwest of Interstate 80 (I-80). The Rodeo Site is currently covered by a mixture of impervious surfaces associated with process equipment, parking areas, roads, and other pervious surfaces. The remaining portion of RREC, southeast of I-80, consists of a tank farm, the Carbon Plant Site, and undeveloped land that serves as a buffer zone.

RREC is shown in Figure 1-1.

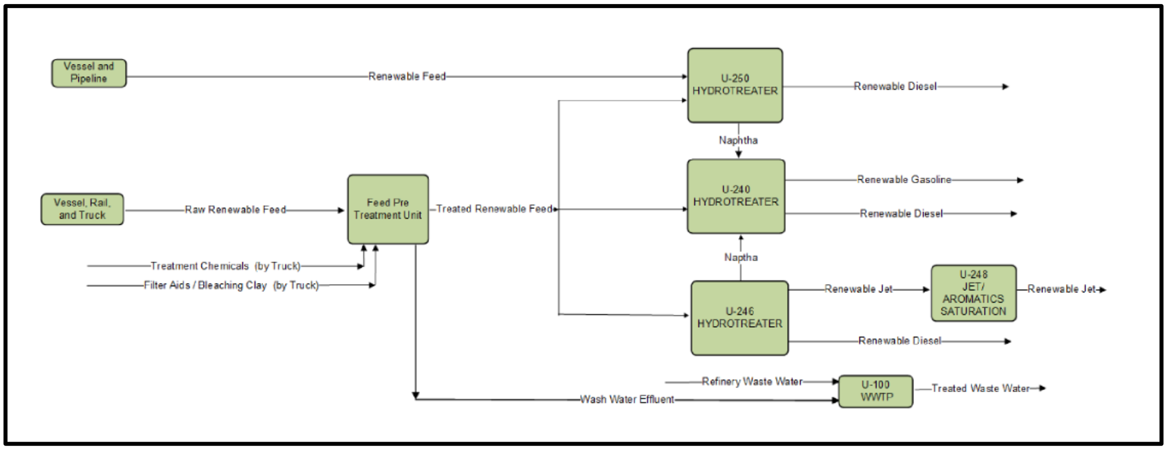
Figure 1-1 Aerial View – Phillips 66 Company Rodeo Renewable Energy Complex (RREC)

Phillips 66 has modified the former Rodeo Refinery into a repurposed facility that processes renewable feedstocks into renewable diesel fuel, renewable components for blending with other transportation fuels, and renewable fuel gas.

The repurposing of the former Rodeo Refinery assists California in meeting its stated goals of reducing GHG emissions and ultimately transitioning to carbon neutrality. It also provides a mechanism for compliance with California's LCFS and Cap-and-Trade programs and the federal Renewable Fuels Standard (RFS), while continuing to meet regional market demand for transportation fuels. The Project can produce up to 50,000 bpd of a variety of renewable transportation fuels from renewable feedstocks.

The block flow schematic for the process is shown in the following figure.

Figure 1-2 Block Flow Schematic



1.2 Model Set-Up

An expanded simplified calculator has been used for the application and the expanded calculator was supplied by CARB. One additional feedstock was added to the CARB calculator.

The values that are location dependent and are set with drop down menus are:

1. The Regional Electricity mix for the renewable diesel plant has been determined using the plant zip code and the US EPA Power Profiler web site.[1] This produces the result of the CAMX e-grid region and the simplified calculator is set to 3-CAMX Mix.
2. The regional crude oil mix is U.S. Average Crude
3. The regional natural gas source is U.S. Average NG.

Hydrogen is produced within the system boundary so no corrections to the simplified calculator has been made to the hydrogen properties.

Given the large differences between feedstock received and feedstock processed for some feedstocks, the transportation emissions for these feedstocks are calculated using quantities processed rather than quantities received.

Other model inputs are entered on other sheets in the model. These are described in the following sections.

[1] https://www.epa.gov/egrid/power-profiler#/

2. FEEDSTOCK

The facility is uniquely situated to secure renewable feedstocks available through marine shipping by having direct marine access through the Marine Terminal in addition to rail and truck transportation. By having these transportation options, Phillips 66 has greater flexibility in selecting renewable feedstocks from a broad variety of sources, including international sources.

There are three separate rail unloading facilities that can be used. There is one rail unloading system within the facility, there is a second third party (Sunoco) operated system directly adjacent to the facility. Both these feed directly into the feedstock storage tanks. There is a third P66 facility in Richmond California that can receive rail vars and the feedstock is then barged to the renewable diesel facility, a distance of 24 miles.

The facility has processed seventeen different feedstock-region combinations. The feedstocks are described in the following sections.

2.1 VEGETABLE OILS

The data on the vegetable oils (including corn oil) are presented in this section.

2.1.1 Soybean Oil

Soybean oil can be shipped by rail directly to one of the facilities described above, from soybean oil suppliers in the United States. The volumes are recorded through a custody transfer meter at the Sunoco Selby rail rack adjacent to the RREC, and receipts are recorded as well for rail offloaded within RREC and independent inspection reports are used for barge receipts from the Richmond terminal. Transportation distances are assigned for each supplier and a monthly average is calculated for the feedstock. The CI calculations have been done on the basis of zero feedstock moisture to be consistent.

Table 2-1 Soybean Oil Feedstock

Month	Soybean Oil					
	Ocean Tanker Pounds Received	Ocean tanker Miles	Rail Pounds Received	Rail Miles	Barge Pounds	Barge Miles
06-2024	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

The opening and closing inventories for the feedstock tanks are recorded and used along with the feedstock receipts to calculate the feedstock processed. The inventory is recorded in temperature corrected barrels and converted to pounds using 42 gallons per barrel and the appropriate density factor. The density factor is 7.7 lbs per gallon.

Table 2-2 Soybean Oil

Month	Opening Inventory	Oil Received	Oil Processed	Closing Inventory
	pounds			
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total		[redacted]	[redacted]	

2.1.2 Argentinian Soybean Oil

Soybean oil from Argentina has also been processed at the facility. This pathway uses the default values for soybean processing with the exception of a higher transportation distance for the soybeans transported to the crush facility.

This oil is loaded on the ship directly at the processing plants in Argentina and shipped to the facility. The feedstock transportation information for this pathway is summarized in the following table. The vessel size is [redacted] DWT and the emission factor is [redacted] g CO_2eq/ton-mile.

Table 2-3 Argentinian Soybean Oil Transportation

Month	Soybean Oil	
	Ship, Pounds Received	Vessel Miles
06-2024	[redacted]	[redacted]
07-2024	[redacted]	[redacted]
08-2024	[redacted]	[redacted]
09-2024	[redacted]	[redacted]
10-2024	[redacted]	[redacted]
11-2024	[redacted]	[redacted]
12-2024	[redacted]	[redacted]
1-2025	[redacted]	[redacted]
Total	[redacted]	[redacted]

The inventory levels for the Argentina soybean oil are shown in the following table.

Table 2-4 Argentinian Soybean Oil

Month	Opening Inventory	Oil Received	Oil Processed	Closing Inventory
	pounds			
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total		[redacted]	[redacted]	

2.1.3 Canola Oil

Canola oil is also received by rail or by rail and ship at RREC. The quantities received by each mode are shown in the following table.

Table 2-5 Canola Oil Feedstock Transportation

Month	Canola Oil			
	Ship Pounds Received	Ship Miles	Rail Pounds Received	Rail Miles
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]

The inventory and processing information is shown in the following table.

Table 2-6 Canola Oil Processed

Month	Opening Inventory	Oil Received	Oil Processed	Closing Inventory
	pounds			
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total		[redacted]	[redacted]	

2.1.4 Corn Oil

Corn oil is received by rail or by rail and barge as the rail volume received at the Richmond terminal is shipped by barge to RREC. The feedstock transportation information for this pathway is summarized in the following table.

Table 2-7 Corn Oil Feedstock Transportation

Month	Corn Oil			
	Rail Pounds Received	Rail Miles	Barge Pounds Received	Barge Miles
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]

The inventory and processing information for corn oil is shown in the following table.

Table 2-8 Corn Oil Processed

Month	Opening Inventory	Oil Received	Oil Processed	Closing Inventory
	pounds			
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total		[redacted]	[redacted]	

2.2 USED COOKING OIL

The six used cooking oil pathways are described below.

2.2.1 Used Cooking Oil US

Used cooking oil from the United States is received by rail. The standard values are used for the rendering energy and emissions.

Table 2-9 US Used Cooking Oil Feedstock Transportation

Month	Used Cooking Oil	
	Rail Pounds Received	Rail Miles
06-2024	[redacted]	[redacted]
07-2024	[redacted]	[redacted]
08-2024	[redacted]	[redacted]
09-2024	[redacted]	[redacted]
10-2024	[redacted]	[redacted]
11-2024	[redacted]	[redacted]
12-2024	[redacted]	[redacted]
1-2025	[redacted]	[redacted]
Total	[redacted]	[redacted]

The inventory and processing information for the US UCO is shown in the following table.

Table 2-10 US UCO Processed

Month	Opening Inventory	Oil Received	Oil Processed	Closing Inventory
	pounds			
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total		[redacted]	[redacted]	

2.2.2 Used Cooking Oil Asia

Used cooking oil from Asia has also been processed at the facility. The oil was collected in Japan and South Korea. The CARB approved Global emission factor of 101.15 g CO_2eq/pound of oil is used. The vessel size is [redacted] DWT and the emission factor is [redacted] g CO_2eq/ton-mile.

Table 2-11 Asia UCO Feedstock Transportation

Month	Used Cooking Oil			
	Truck Transport	Truck Miles	Ocean Vessel Pounds Received	Ocean Vessel Miles
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]

The inventory and processing information for UCO from Asia is shown in the following table.

Table 2-12 Asia Used Cooking Oil Processed

Month	Opening Inventory	Oil Received	Oil Processed	Closing Inventory
	pounds			
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total		[redacted]	[redacted]	

2.2.3 Used Cooking Oil Malaysia/Indonesia

Used cooking oil from Malaysia and Indonesia has also been processed at the facility. The CARB approved Global emission factor of 101.15 g CO_2eq/pound of oil is used. The vessel size is [redacted] DWT and the emission factor is [redacted] g CO_2eq/ton-mile.

Table 2-13 Malaysia/Indonesia UCO Feedstock Transportation

Month	Used Cooking Oil			
	Truck Transport	Truck Miles	Ocean Vessel Pounds Received	Ocean Vessel Miles
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]

The inventory and processing information for corn oil is shown in the following table.

Table 2-14 Malaysia/Indonesia Used Cooking Oil Processed

Month	Opening Inventory	Oil Received	Oil Processed	Closing Inventory
	pounds			
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total		[redacted]	[redacted]	

2.2.4 Used Cooking Oil China

Used cooking oil from China has been processed. The CARB approved China emission factor of 110.04 g CO_2eq/pound of oil is used. The vessel size is [redacted] DWT and an emission factor of [redacted] g CO_2eq/ton-mile is used.

Table 2-15 China UCO Feedstock Transportation

Month	Used Cooking Oil			
	Truck Transport	Truck Miles	Ocean Vessel Pounds Received	Ocean Vessel Miles
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]

The inventory and processing information for UCO from China is shown in the following table.

Table 2-16 China UCO Processed

Month	Opening Inventory	Oil Received	Oil Processed	Closing Inventory
	pounds			
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total		[redacted]	[redacted]	

2.2.5 Used Cooking Oil South America

Used cooking oil from South America has also been processed at the facility. The CARB approved South America emission factor of 80.58 g CO_2eq/pound of oil is used. The vessel size is [redacted] DWT and the emission factor is [redacted] g CO_2eq/ton-mile.

Table 2-17 South America UCO Feedstock Transportation

Month	Used Cooking Oil			
	Truck Transport	Truck Miles	Ocean Vessel Pounds Received	Ocean Vessel Miles
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]

The inventory and processing information for corn oil is shown in the following table.

Table 2-18 South America Used Cooking Oil Processed

Month	Opening Inventory	Oil Received	Oil Processed	Closing Inventory
	pounds			
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total		[redacted]	[redacted]	

2.2.6 Used Cooking Oil Oceania

Used cooking oil from Asia has also been processed at the facility. The oil was collected in Australia and New Zealand. The CARB approved emission factor of 110.23 g CO_2eq/pound of oil is used. The vessel size is [redacted] DWT and the emission factor is [redacted] g CO_2eq/ton-mile.

Table 2-19 Oceania UCO Feedstock Transportation

Month	Used Cooking Oil			
	Truck Transport	Truck Miles	Ocean Vessel Pounds Received	Ocean Vessel Miles
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]

The inventory and processing information for corn oil is shown in the following table.

Table 2-20 Oceania Used Cooking Oil Processed

Month	Opening Inventory	Oil Received	Oil Processed	Closing Inventory
	pounds			
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total		[redacted]	[redacted]	

2.3 TALLOW

The information on the seven tallow pathways is presented below.

2.3.1 Tallow US

US tallow is received by rail at the facility. The information is shown in the following table.

Table 2-21 US Tallow Feedstock Transportation

Month	Tallow	
	Rail Pounds Received	Rail Miles
06-2024	[redacted]	[redacted]
07-2024	[redacted]	[redacted]
08-2024	[redacted]	[redacted]
09-2024	[redacted]	[redacted]
10-2024	[redacted]	[redacted]
11-2024	[redacted]	[redacted]
12-2024	[redacted]	[redacted]
1-2025	[redacted]	[redacted]
Total	[redacted]	[redacted]

The inventory and processing information for US tallow is shown in the following table.

Table 2-22 US Tallow Processed

Month	Opening Inventory	Oil Received	Oil Processed	Closing Inventory
	pounds			
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total		[redacted]	[redacted]	

2.3.2 Tallow Europe

Tallow imported from Europe is also processed. The electricity mix from the UK for 2023 from the IEA was used in the CA GREET 3.0 model to generate an emission factor of 263 g CO_2eq/pound of oil. The electricity emission factor is 308.19 g CO_2eq/kWh. The tallow is shipped in a [redacted] DWT vessel and the emission factor is [redacted] g CO_2eq/ton-mile.

Table 2-23 Europe Tallow Feedstock Transportation

Month	Tallow			
	Truck Transport	Truck Miles	Ocean vessel Pounds Received	Vessel Miles
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]

The inventory and processing information for the tallow is shown in the following table.

Table 2-24 Europe Tallow Processed

Month	Opening Inventory	Oil Received	Oil Processed	Closing Inventory
	pounds			
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total		[redacted]	[redacted]	

2.3.3 Tallow Africa

The tallow from Africa uses a rendering emission factor of 347 g CO_2eq/pound of oil. The vessel size is [redacted] DWT and the emission factor is [redacted] g CO_2eq/tom-mile.

Table 2-25 Africa Tallow Feedstock Transportation

Month	Tallow			
	Truck Transport	Truck Miles	Ocean vessel Pounds Received	Vessel Miles
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]

The inventory and processing information for Africa tallow is shown in the following table.

Table 2-26 Africa Tallow Processed

Month	Opening Inventory	Oil Received	Oil Processed	Closing Inventory
	pounds			
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total		[redacted]	[redacted]	

2.3.4 Tallow Asia

The tallow from Asia uses an electricity emission factor of 936 g CO_2/kWh which produces a rendering emission factor of 348 g CO_2eq/pound of oil. The vessel size is [redacted] DWT and the emission factor is [redacted] g CO_2eq/tom-mile.

Table 2-27 Asia Tallow Feedstock Transportation

Month	Tallow			
	Truck Transport	Truck Miles	Ocean vessel Pounds Received	Vessel Miles
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]

The inventory and processing information for Asia tallow is shown in the following table.

Table 2-28 Asia Tallow Processed

Month	Opening Inventory	Oil Received	Oil Processed	Closing Inventory
	pounds			
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total		[redacted]	[redacted]	

2.3.5 Tallow Oceania

The tallow from Oceania uses an electricity emission factor of 1212 g CO_2/kWh which produces a rendering emission factor of 384.99 g CO_2eq/pound of oil. The vessel size is [redacted] DWT and the emission factor is [redacted] g CO_2eq/tom-mile.

Table 2-29 Oceania Tallow Feedstock Transportation

Month	Tallow			
	Truck Transport	Truck Miles	Ocean vessel Pounds Received	Vessel Miles
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]

The inventory and processing information for Oceania tallow is shown in the following table.

Table 2-30 Oceania Tallow Processed

Month	Opening Inventory	Oil Received	Oil Processed	Closing Inventory
	pounds			
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total		[redacted]	[redacted]	

2.3.6 Tallow South America

Tallow from South America is received by ocean vessel.

Table 2-31 South America Tallow Feedstock Transportation

Month	Tallow			
	Truck Transport	Truck Miles	Ocean vessel Pounds Received	Vessel Miles
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]

The inventory and processing information for South America tallow is shown in the following table. The electricity emission factor is 311 g CO_2/kWh and the rendering emissions are 263 g CO_2eq/pound of oil.

Table 2-32 South America Tallow Processed

Month	Opening Inventory	Oil Received	Oil Processed	Closing Inventory
	pounds			
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total		[redacted]	[redacted]	

2.3.7 Tallow Brazil

The tallow from Brazil uses an electricity emission factor of 310 g CO_2/kWh which produces a rendering emission factor of 250.23 g CO_2eq/pound of oil. The vessel size is [redacted] DWT and the emission factor is [redacted] g CO_2eq/tom-mile.

Table 2-33 Brazil Tallow Feedstock Transportation

Month	Tallow			
	Truck Transport	Truck Miles	Ocean vessel Pounds Received	Vessel Miles
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]

The inventory and processing information for Brazil tallow is shown in the following table.

Table 2-34 Brazil Tallow Processed

Month	Opening Inventory	Oil Received	Oil Processed	Closing Inventory
	pounds			
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total		[redacted]	[redacted]	

3. RENEWABLE DIESEL PRODUCTION

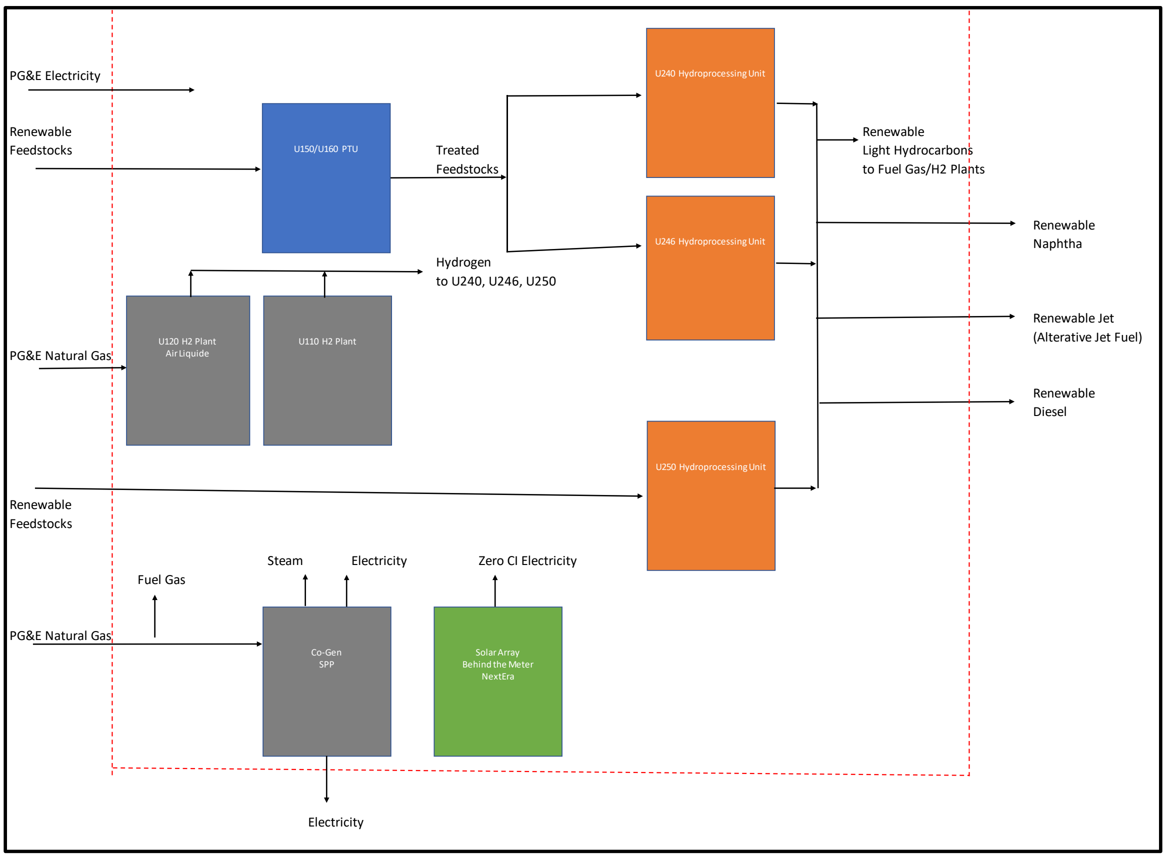
The production of renewable diesel requires energy and chemical inputs. The calculator has a number of required inputs for renewable diesel production. These include data on the co-products. These are discussed below.

3.1 PROCESS

The facility includes a cogeneration facility that produces steam and electricity for use by the facility and for sales to balance the system. There is a third-party hydrogen plant on site, that supplies all its hydrogen to RREC. It also supplies team and some electricity to RREC. The energy use data for this facility is available and it has been included in the system boundary. Including this facility in the system boundary reduces the flows across the system boundaries and simplifies the calculation of the carbon intensities.

The system boundary for the modelling is shown in the following figure.

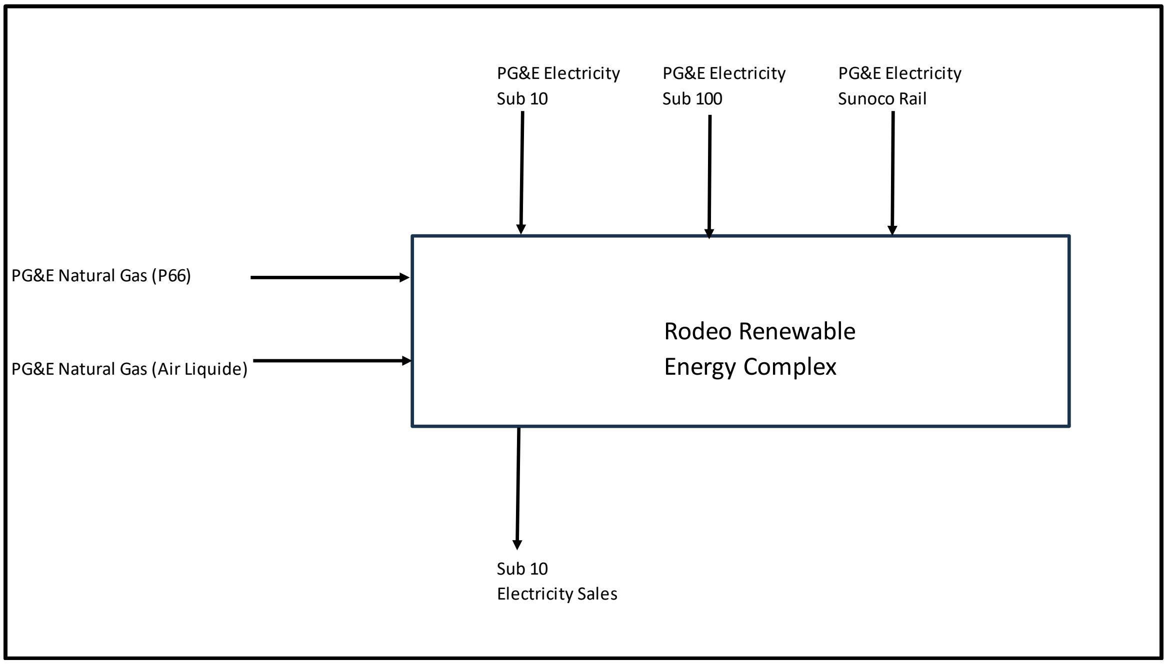
Figure 3-1 System Boundary



Some hydrogen is produced by P66 and some is purchased from the adjacent third party. The purchased hydrogen is produced from natural gas and from renewable co-products from the P66 facility.

The co-gen facility uses natural gas and renewable coproducts. Electricity is purchased from the local utility (PG&E) and some is sold to the local utility if some of the units are down. The energy complex energy flows are shown in the following figure.

Figure 3-2 Utility Flows



Additional sheets have been added to the simplified calculator to calculate the net flows that are added to the RD production sheet in the simplified calculator.

3.2 MASS INPUTS AND OUTPUTS

The renewable diesel that is sold is calculated from the sum of metered product used for blending, the sales of R100 and R99 (adjusted for the fossil diesel content) and the change in inventory in the R100 and R99 storage tanks. The data in the calculator is summarized in the following table.

Table 3-1 Renewable Diesel Production

Month	Opening Inventory	Renewable Diesel Produced	Closing Inventory	Renewable Diesel Sold
	Gallons			
06-2024	[redacted]	[redacted]	[redacted]	[redacted]
07-2024	[redacted]	[redacted]	[redacted]	[redacted]
08-2024	[redacted]	[redacted]	[redacted]	[redacted]
09-2024	[redacted]	[redacted]	[redacted]	[redacted]
10-2024	[redacted]	[redacted]	[redacted]	[redacted]
11-2024	[redacted]	[redacted]	[redacted]	[redacted]
12-2024	[redacted]	[redacted]	[redacted]	[redacted]
1-2025	[redacted]	[redacted]	[redacted]	[redacted]
Total		[redacted]	[redacted]	

The yield is calculated from the input data. The co-product production is discussed later.

3.3 ENERGY REQUIREMENTS

There are just three external energy inputs into the process. The streams are:

1. Electricity
2. Natural Gas
3. Renewable fuel gas

These are discussed in the following sections. There are calculations required for the streams to arrive at the net values for the simplified calculator.

3.3.1 Electricity

There are several electricity flows in the system. Electricity is purchased from the utility through two meters (two substations) and electricity from the utility is consumed for the adjacent Sunoco rail car unloading facility, and the electricity produced by the co-gen unit. The flows are summarized on the Net Electricity sheet that has been added to the calculator. The electricity for the calculator is the sum of the electricity purchased through the two substations (sub 10 and sub 100) at Rodeo plus the electricity consumed at the Sunoco rail car offloading facility.

A solar electricity project built on site and is expected to start delivering electricity behind the utility meter in Q2 2025, which will reduce the purchases of electricity from the utility.

The electricity consumption for the calculator is shown in the following table.

Table 3-2 Electricity Consumption

Month	Electricity, kWh
06-2024	[redacted]
07-2024	[redacted]
08-2024	[redacted]
09-2024	[redacted]
10-2024	[redacted]
11-2024	[redacted]
12-2024	[redacted]
1-2025	[redacted]
Total	[redacted]

3.3.2 Natural Gas

The natural gas received by the facility is the gas invoiced by the utility (PG&E). This gas is used in the Cogen facility, some process heaters, and for hydrogen production. Some months there are electricity exports from the P66 system boundary. The Energy allocation method is used to determine the natural gas that is associated with this exported electricity. An example of the calculations is included in a new sheet, Energy Allocation Example that has been added to the calculator. The example is for the month of January 2025. The electricity exported is minimal when the overall production is closer to capacity when all units are up and running.

A new sheet has been added to the calculator called NG. This sheet has the data from all of the NG meters and the natural gas associated with the electricity exports.

Table 3-3 Natural Gas Consumption

Month	Natural Gas, MM BTU (HHV)
06-2024	[redacted]
07-2024	[redacted]
08-2024	[redacted]
09-2024	[redacted]
10-2024	[redacted]
11-2024	[redacted]
12-2024	[redacted]
1-2025	[redacted]
Total	[redacted]

3.3.3 Renewable Fuel Gas

The renewable fuel gases that are produced by the process are combusted on site in the heaters, co-gen unit and for hydrogen production. CARB has supplied an emission factor of 190 g CO_2eq/MM BTU to account for the methane and nitrous oxide emissions from the combustion of this stream. The monthly production and use of these gases is shown in the following table.

Table 3-4 Renewable Fuel Gas Consumption

Month	Renewable Fuel Gas, MM BTU (HHV)
06-2024	[redacted]
07-2024	[redacted]
08-2024	[redacted]
09-2024	[redacted]
10-2024	[redacted]
11-2024	[redacted]
12-2024	[redacted]
1-2025	[redacted]
Total	[redacted]

This stream is a mixture of gases and to be conservative the ratio of HHV to LHV has been set to 1.0.

3.4 CO-PRODUCTS

The P66 plant has three different co-product streams that are produced. They are discussed below.

- Light Hydrocarbon stream
- Renewable Naphtha Stream
- Jet fuel stream

They are described in the following sections.

3.4.1 Light Hydrocarbons

There is some renewable fuel gas, including renewable propane, which is produced in the process. This light hydrocarbon stream is consumed on site mostly as feedstock fuel for the production of hydrogen. There are no emissions included due to the biogenic nature of the stream and the fact that a large portion of the stream is not combusted.

3.4.2 Naphtha

There is some renewable naphtha that is produced in the process. The production quantities are shown in the following table. The energy content of the stream is [redacted] BTU/gal (LHV).

Table 3-5 Naphtha Production

Month	Naphtha, gallons
06-2024	[redacted]
07-2024	[redacted]
08-2024	[redacted]
09-2024	[redacted]
10-2024	[redacted]
11-2024	[redacted]
12-2024	[redacted]
1-2025	[redacted]
Total	[redacted]

3.4.3 Jet Fuel

Some jet fuel has been produced in recent months. The volume produced is shown in the following table. The energy content of the product is [redacted] BTU/gallon (LHV) based on plant data.

Table 3-6 Jet Fuel Production

Month	Renewable Jet Fuel, gallons
06-2024	[redacted]
07-2024	[redacted]
08-2024	[redacted]
09-2024	[redacted]
10-2024	[redacted]
11-2024	[redacted]
12-2024	[redacted]
1-2025	[redacted]
Total	[redacted]

3.5 Mass Balance

With some of the fuel produced by the facility being used in the process it is not possible to calculate an accurate mass balance. The available information is shown in the following table. The water is estimated.

Table 3-7 Mass Balance

Parameter	Inputs	Outputs
Feedstock, pounds	[redacted]	
Renewable Diesel, pounds		[redacted]
Renewable Naphtha, pounds		[redacted]
Renewable Jet, pounds		[redacted]
Water		[redacted]
Total	[redacted]	[redacted]

4. Renewable Diesel Transport

Phillips 66 sells the renewable diesel at the refinery gate and ships some by barge to other California locations.

The weighted average barge transportation distance of 166 miles is entered into the calculator.

5. TANKS TO WHEELS

The tank to wheels emissions are the same for all renewable diesel fuels. This emission category calculates the methane and nitrous oxide emissions associated with the combustion of renewable diesel in the vehicle. The value in CA GREET 3.0 is 0.76 g CO_2eq/MJ.

6. INDIRECT LAND USE CHANGE

The indirect land use change charge for soybean renewable diesel is 29.10 g CO_2eq/MJ. The indirect land use change charge for canola oil is 14.5 g CO_2eq/MJ. The other feedstocks do not have indirect land use charges.

7. SUMMARY

The emissions calculated for the individual stages are summed to determine the fuel cycle CI. The results for the P66 renewable diesel and renewable naphtha pathways are shown in the following tables.

Table 7-1 Lifecycle GHG Emissions – P66 Vegetable Oil Renewable Diesel

Feedstock	Soybean Oil - Rail	Argentinian Soybean Oil	Canola Oil	Corn Oil
Stage	gCO_2e/MJ			
Feedstock Production	[redacted]	[redacted]	[redacted]	[redacted]
Fuel Production	[redacted]	[redacted]	[redacted]	[redacted]
Indirect Land Use	29.10	29.10	14.50	0.00
Tailpipe Emissions	0.76	0.76	0.76	0.76
RD	58.29	65.42	53.89	29.77

The next two tables are for used cooking oil pathways.

Table 7-2 Lifecycle GHG Emissions – P66 UCO Renewable Diesel

Feedstock	UCO Asia	UCO Malay/Indo	UCO China
Stage	gCO_2e/MJ		
Feedstock Production	[redacted]	[redacted]	[redacted]
Fuel Production			
Indirect Land Use	0.00	0.00	0.00
Tailpipe Emissions	0.76	0.76	0.76
RD	26.70	31.51	30.36

Table 7-3 Lifecycle GHG Emissions – P66 UCO Renewable Diesel

Feedstock	UCO North America	UCO South America	UCO Oceania
Stage	gCO_2e/MJ		
Feedstock Production	[redacted]	[redacted]	[redacted]
Fuel Production			
Indirect Land Use	0.00	0.00	0.00
Tailpipe Emissions	0.76	0.76	0.76
RD	23.44	25.23	28.70

The next two tables are for tallow pathways.

Table 7-4 Lifecycle GHG Emissions – P66 Tallow Renewable Diesel

Feedstock	Tallow North America	Tallow Europe	Tallow Africa	Tallow Asia
Stage	gCO_2e/MJ			
Feedstock Production	[redacted]	[redacted]	[redacted]	[redacted]
Fuel Production	[redacted]	[redacted]	[redacted]	[redacted]
Indirect Land Use	0.00	0.00	0.00	0.00
Tailpipe Emissions	0.76	0.76	0.76	0.76
RD	33.85	37.26	44.28	42.51

Table 7-5 Lifecycle GHG Emissions – P66 Tallow Renewable Diesel

Feedstock	Tallow Oceania	Tallow South America	Tallow Brazil
Stage	gCO_2e/MJ		
Feedstock Production	[redacted]	[redacted]	[redacted]
Fuel Production	[redacted]	[redacted]	[redacted]
Indirect Land Use	0.00	0.00	0.00
Tailpipe Emissions	0.76	0.76	0.76
RD	43.86	37.00	37.91

The carbon intensity of the renewable naphtha and renewable jet fuel are the same as the renewable diesel in the CARB system.