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NEXBTL RENEWABLE DIESEL – MASS BALANCE METHOD

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1 Changes

This instruction is an updated version without highlighting the changes..

2 Purpose of the instruction

This document describes Neste Oil's mass balance method used in fulfillment of requirements given in European Union Renewable Energy Directive (RED).

3 Scope and effective date

This instruction is applied in Neste Oil Corporation, and may be applied by the parties subscribing to HVO Renewable Diesel RED Voluntary Scheme. The effective date is the date the European Commission recognizes this system as a voluntary scheme for the verification of RED compliance.

4 Definitions

The definitions given in DIRECTIVE 2009/28/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (RED) do apply[1].

In addition to these, the following definitions also apply:

Chain of Custody - The method by which a connection is made between data, information or claims concerning raw materials or intermediate products and claims concerning final products is known as the chain of custody, including all the stages from the feedstock production up until release of the fuels for consumption (CEN/TC 383/WG 5, working draft July 2010).

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[1] **18.1**
Where biofuels and bioliquids are to be taken into account for the purposes referred to in points (a), (b) and (c) of Article 17(1), Member States shall require economic operators to show that the sustainability criteria set out in Article 17(2) to (5) have been fulfilled. For that purpose they shall require economic operators to use a mass balance system which:

(a) allows consignments of raw material or biofuel with differing sustainability characteristics to be mixed;

(b) requires information about the sustainability characteristics and sizes of the consignments referred to in point (a) to remain assigned to the mixture; and

(c) provides for the sum of all consignments withdrawn from the mixture to be described as having the same sustainability characteristics, in the same quantities, as the sum of all consignments added to the mixture.

Economic operator is an individual or organisation which has ownership or physical control of biomass, intermediate products, semi-finished products, and products produced thereof, from their origin to their market availability of the biofuel or bioliquid for one or several steps in the chain of custody. Note: Organisation is being used here as defined in ISO 14001 (CEN/TC 383/WG 5, working draft July 2010).

Mass balance system means a system in which "sustainability characteristics" remain assigned to "consignments". In the mass balance system, each economic operator (within EU member state or third country) keeps track of the amount of sustainable biomass, biofuel or bioliquid it sources and the amount of sustainable biomass, biofuel or bioliquid it delivers (CEN/TC 383/WG 5 working draft July 2010).

Mixture is a mix of substances (either agricultural products, intermediate products of biofuels and bioliquids) from different consignments. A "mixture" can have any form where consignments would normally be in contact, such as in a container, processing or logistical facility or site (defined as a geographical location with precise boundaries within which products can be mixed). Separate sizes and sustainability characteristics of each consignment remain assigned to the mixture (CEN/TC 383/WG 5 working draft July 2010).

Product declaration is a document passed on to the next economic operator in the chain of custody specifying properties, sustainability characteristics and GHG emission data of a defined consignment (CEN/TC 383/WG 5 working draft July 2010).

5 Related documents

Documents related to this instruction:

1. HVO Renewable diesel Scheme for Verification of compliance with the sustainability criteria for Biofuels
2. NExBTL RENEWABLE DIESEL - GREENHOUSE GAS (GHG) DATA HANDLING
3. NExBTL RENEWABLE DIESEL - REQUIREMENTS FOR TRACEABILITY

6 Responsibilities

Responsible person for updating this instruction is the Director, Sustainability and Supplier Compliance.

7 Mass balance methodology

7.1 Basic elements for application of the mass balance method

The mass balance method shall balance the GHG emission data of all RED compliant consignments at the end of the inventory period and exclude from this GHG balance all non-RED compliant consignments. Only RED-compliant consignments shall be

accounted for in the GHG balance. The GHG data from the proportion of RED compliant consignments that are not destined for use as biofuel shall also be excluded from the mass balance calculation, to avoid allocation of GHG emission savings to the bioenergy consignments portion. Within the inventory period, the economic operators shall have flexibility to manage their GHG balance for individual consignments.

Non-RED compliant consignments may not be used in calculating aggregated GHG emission saving data. When a facility operates simultaneously for production of the same material both for energy and non-energy application, the production for non-energy application is excluded from the GHG balance. When a production facility cannot distinguish the process between bio-based material for energy purpose and for other applications, the GHG impact of the production process will be deemed equal for all applications.

When consignments with the same sustainability characteristics are mixed, only the sizes of the consignment are adjusted accordingly. Sustainability characteristics are likely to be the same when the similar raw materials are used and use is made of "default values" or "regional actual values".

When consignments with different sustainability characteristics are mixed, the separate sizes and sustainability characteristics of each consignment remain assigned to the mixture.

If a mixture is split up, any consignment taken out of it can be assigned any of the sets of sustainability characteristics (accompanied with sizes) as long as the combination of all consignments taken out of the mixture has the same sizes for each of the sets of sustainability characteristics that were in the mixture.

The balance can be achieved over an appropriate period of time and regularly verified. The inventory period duration shall be equal to or less than 3 months. It is necessary for appropriate arrangements to be in place to ensure that the balance is respected. The amount of RED compliant material going out of a mixture must be equal to the amount of RED compliant material going into the mixture (provided that corresponding conversion values have been applied).

7.2 Mass balance method in practice at Neste Oil

In the Neste Oil mass balance system, the company keeps track of the amount of sustainable biomass it receives and the amount of sustainable biofuel it delivers. Mass balance reporting stands for reporting of necessary sustainability data between economic operators of supply chain.

Mass balance means that no physical traceability is essential, but data from raw materials purchased and sales should be in balance in site level, as presented in Figure 1. Each economic operator in the supply chain needs to keep track of their own balance of data.

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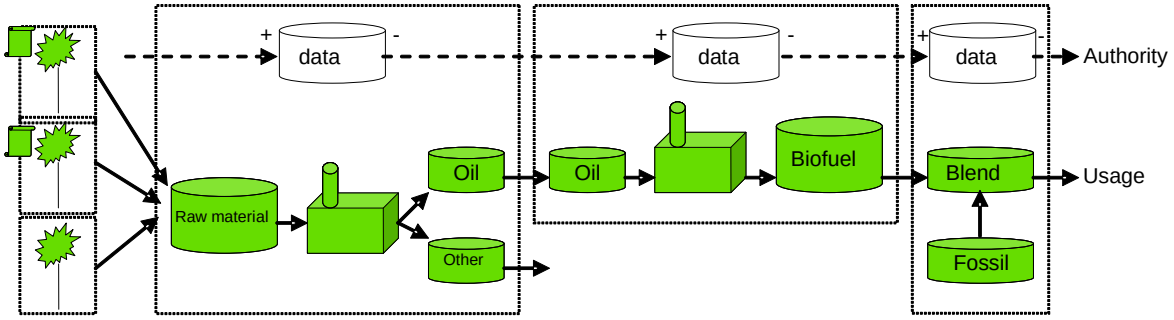

Figure 1 Flowchart of mass balance in regular case

Mass balance report demands that the company needs to keep track of the data and reports them to the customers or to the authorities. Figure 2 presents an example situation when Neste Oil has an external inventory for raw materials. The inventory must have its own mass balance data. Another thing to point out is Porvoo's two NExBTL units which have the same mass balance data, because they are connected by pipelines.

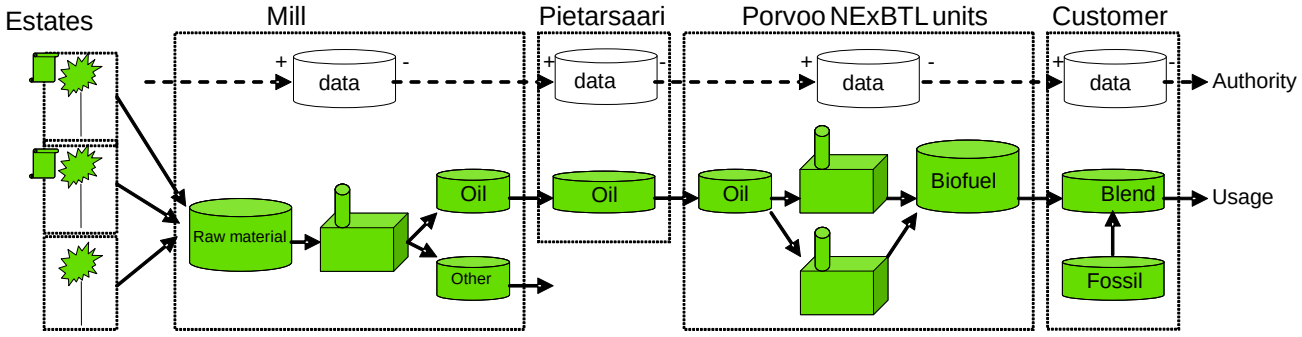

Figure 2 An example of situation with intermediate inventory

Figure 3 shows in practice how many different mass balance entities Neste Oil has now.. Every site and external inventory as well as Neste Oil Oyj needs to keep track on data.

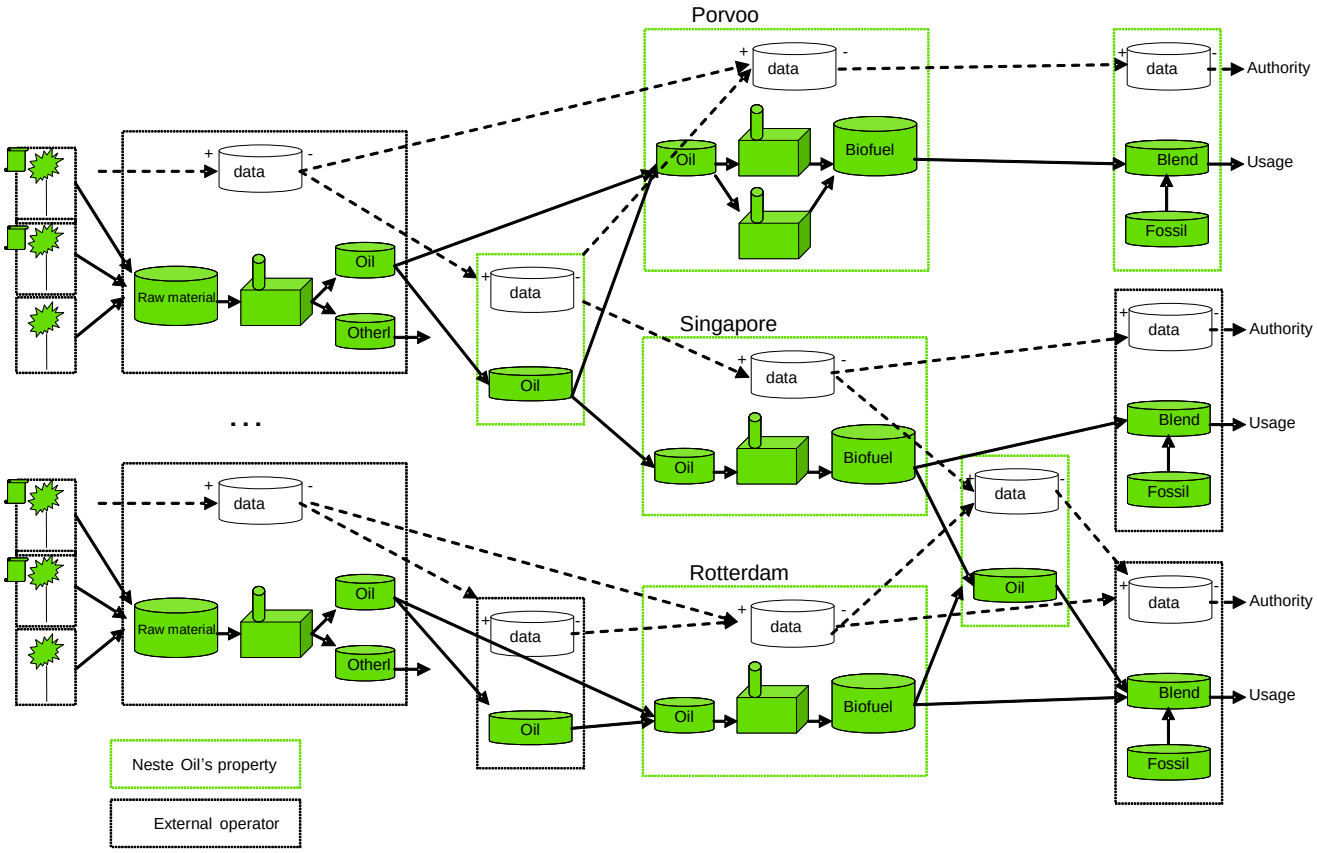

Figure 3 Neste Oil's reporting in practice for NExBTL.

7.3 Information needed for mass balance system

When Neste Oil receives or delivers a consignment, the company will request or deliver a product declaration which ensures the compliance with RED. The product declaration concerning each consignment will include at least the following information:

a) economic operator's identification;

b) conformity assessment statement reference or other valid reference demonstrating the RED compliance of the economic operator;

c) quantity of delivery;

d) date of delivery ;

e) product description,

f) unique reference number enabling the tracing of the issued document within the internal mass-balance accounting system;

g) cumulative greenhouse gas emission data, including emission received from the previous economic operators, in gCO2eq/MJ (LHV) or gCO2eq/t,.

h) Statement that delivered material is compliant with RED art 17(3) to 17(5),

i) Country of origin of biomass

j) Information on any RED-compliant land use change that has taken place after January 1, 2008 for the purposes of the GHG calculation

k) Optional elements :

- Fraction of origin from degraded land according to RED 18.4 (Point 9 part C of Annex V) or
- Fraction from waste or residue, as defined in the chapter 2.2., point 9 of the HVO voluntary scheme

l) Reference to third party conformity assessed sustainability criteria certified according to EC recognized voluntary scheme.

7.4 Timeframe for mass balance methodology in Neste Oil

The mass balance method shall be applied within a periodic inventory period with a maximum duration of 3 months.

7.5 Mass balance calculation methodology applied in Neste Oil

The calculation methodology applied in Neste Oil is mass balance with physical mixing and documentation of quantity credits. Neste Oil keeps track of all the quantities that come in and that go out from a unit that is defined to act as single reporting unit (site), and they are matched in terms of mass balance.

7.6 Greenhouse gas emission figure for biofuel produced by Neste Oil

GHG emission data shall be calculated and reported in gCO2eq/MJ by following the company standard practice for NExBTL RENEWABLE DIESEL - GREENHOUSE GAS (GHG) DATA HANDLING.

Annex A . Details for mass balance calculation methodology

A.1 Conversion factors

Conversion factors have to be provided for all elements of the production and distribution chain, in which conversion processes are used. This has to be applied both for physical segregation and mixing. The conversion factor is defined as follows:

C (%) = Ao/Ai * 100
C: **C**onversion factor
Ai: **A**mount of the process **i**nput material
Ao: **A**mount of **o**utput yielded by the internal process based on input Mi

In the framework of mass balance calculation of conversion processes, the amount of sold or withdrawn sustainable products within one period should not be larger than the product of the amount Ai going into the process times the conversion factor C.

A.2 Mass balance

Mass balance methodology allows the mixing of batches of different sizes and different sustainability characteristics on every stage of the value chain. Due to physical mixing the mixture loses its individual properties. The specific properties of sustainable product can therefore only be determined via bookkeeping. This requires calculation and periodic monitoring of the mass balance calculation.

Quantity credit methodology

When using the quantity credit option, batches of incoming sustainable products can be aggregated for the timeframe in form of quantity credit. The timeframe used for aggregation shall not be longer than the chosen timeframe period. Aggregation is based on the total sum of the amount of all batches of sustainable products. Within the timeframe batches of sustainable products can be arbitrarily split as long as the total amount does not exceed the quantity credit.

If within one period larger amount of sustainable product or sustainability criteria has been received (including the existing inventory) than the dispatched amount, the surplus of sustainable product or criterion is defined as positive credit. The transfer of positive credits from one period to the other is only possible if the credit transfer is covered by the equivalent quantity of physical biomass, bioliquid or biofuel (i.e. it is not possible to transfer more positive credits into the next period than the quantity which is physically in stock at the end of the period).

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A.3 Special restrictions for Greenhouse Gas calculations

Communication from the Commission on voluntary schemes and default values in the EU biofuels and bioliquids sustainability scheme (2010/C 160/01) clarifies the use of mass balance system:

> The mass balance system means a system in which 'sustainability characteristics' remain assigned to 'consignments'. Sustainability characteristics could include for example:
>
> - evidence showing compliance with the Directive's sustainability criteria, and/or
> - a statement that the raw materials used were obtained in a way that complies with the Directive's land related sustainability criteria, and/or
> - a description of the raw material used, and/or
> - the statement 'production has been awarded a certificate of type X from recognised voluntary scheme Y', etc.
>
> Sustainability characteristics would have to include information on the country of origin of the feedstock, except for bioliquids).
>
> When consignments with different (or no) sustainability characteristics are mixed, the separate sizes and sustainability characteristics of each consignment remain assigned to the mixture. If a mixture is split up, any consignment taken out of it can be assigned any of the sets of sustainability characteristics (accompanied with sizes) as long as the combination of all consignments taken out of the mixture has the same sizes for each of the sets of sustainability characteristics that were in the mixture. A 'mixture' can have any form where consignments would normally be in contact, such as in a container, processing or logistical facility or site (defined as a geographical location with precise boundaries within which products can be mixed).
>
> The balance in the system can be continuous in time, in which case a 'deficit', i.e. that at any point in time more sustainable material has been withdrawn than has been added, is required not to occur. Alternatively the balance could be achieved over an appropriate period of time and regularly verified. In both cases it is necessary for appropriate arrangements to be in place to ensure that the balance is respected.
>
> Thus, if the characteristics include **different figures on greenhouse gas emissions** they remain separate; these figures **cannot be averaged for the purpose of showing compliance with the sustainability requirements**.
>
> The communications does explicitly prohibit the averaging of different greenhouse gas values (carbon intensity figures) **for the purpose of reaching the required greenhouse gas saving target**, i.e. 35%, later 50% or 60% saving. Thus, mixing e.g. 30% and 70% consignments in order to meet the 35% target is not allowed.
>
> **Additionally**, regarding the processing part of the supply chain: the use of the most conservative value is required, if there are a range of measured values (please see the GHG instruction, chapter 7.1.1.2 on page 6.

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Figure 1. Flow chart of Palm Oil based NExBTL renewable diesel (part 1/2), cultivation, milling, transport

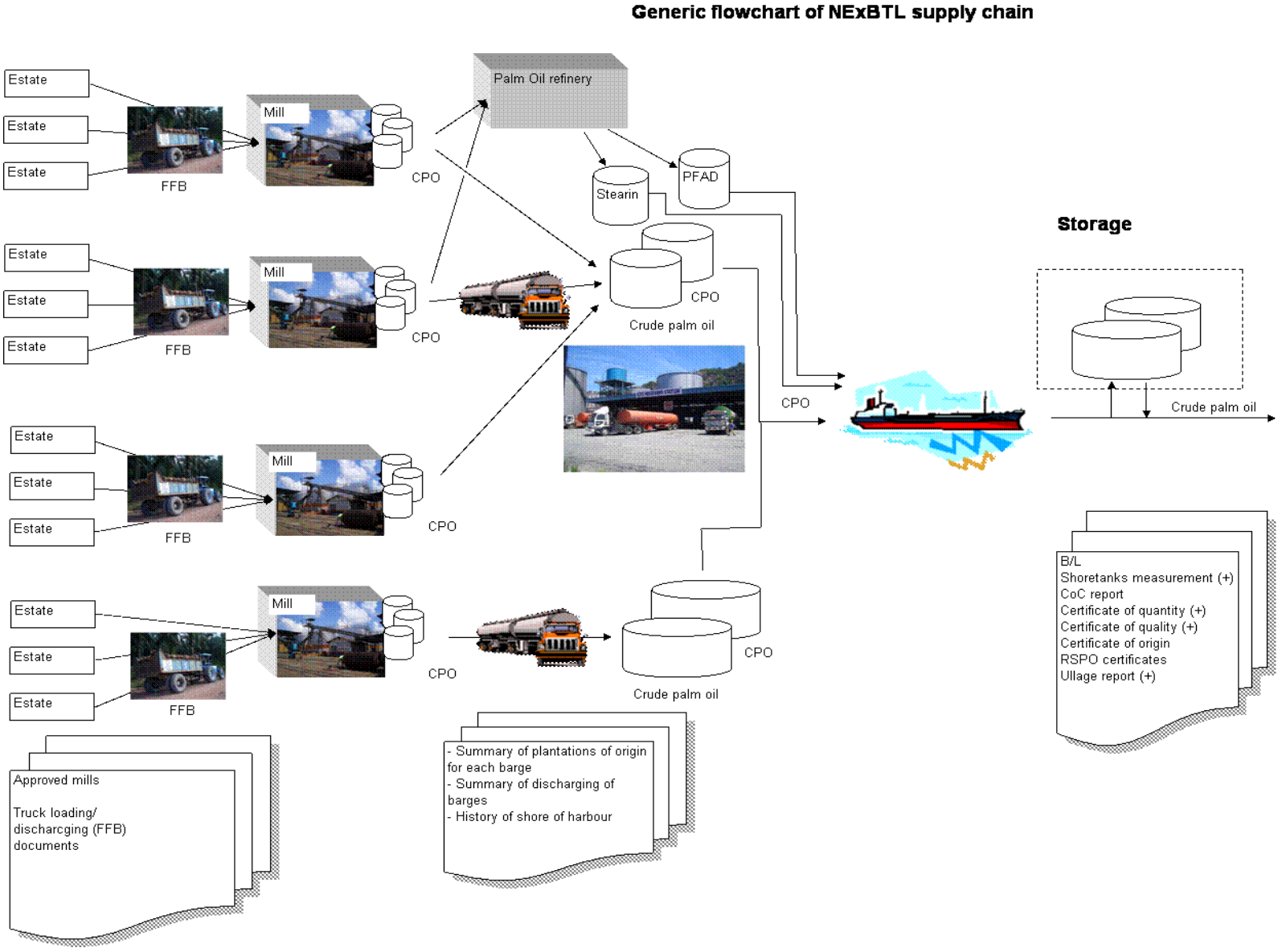

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Figure 2. Flow chart of Palm Oil based HVO renewable diesel (part 2/2), NExBTL production, transport, distribution