All India's International Trade of Four Specific commodities in the Recent Past Some Insights Preface

The study uses trade indicators to analyse merchandise export and import data in a way that should be useful for the purpose of policy. The indicators provide a glimpse of the trade patterns of the world and the performance of India in comparison to various other countries. They have been used in the case of India's exports of **Cyclic Hydrocarbons, Unwrought Aluminium & Electri Transformer, Static Converter & Inductor** and imports of **Palm Oils and Its Fractions** to indicate the possible directions policy may take.

The data used in this study has been sourced from the Export Import Data Bank of the DGCI&S, Department of Commerce, and Government of India and from the United Nations Comtrade Database. Introduction notes of each commodities has been sourced from the various sights –viz Wikipedia, Britannica, The Economic Times etc.

Computations are based on data at ITC-HS four-digit level (ITC-HS Code-2902 & 7601 for export and 8504 & 1511 for import) and the latest finalized data available on the UN Comtrade Database up to year 2022 and on the DGCI&S Database up to August 2023. So, trends from 2019 to 2022 have been shown when we extract the data from UN Comtrade and from 2019 to 2022 have been shown when we extract the data from DGCIS Data base.

In this report, we will see various analysis and aspects of India's Precious as well as International export trade of Cyclic Hydrocarbons, Unwrought Aluminium & Electri Transformer, Static Converter & Inductor and imports of Palm Oils and Its Fractions**.** We will use both the 4 digit Commodity codes, for our analysis, as appropriate.

Trends in India's as well as International Trade i.e. Exports and Imports of above four Commodities are given below in different tables :

- Table 1 : India's top 10 Export destination of Cyclic Hydrocarbons with their shares in percentage.
- Table 2 : World's top 10 Exporters of Cyclic Hydrocarbons with their shares in percentage.
- Table 3 : World's top 10 Importers of Cyclic Hydrocarbons with their shares in percentage.
- Annex- I : Top 3 sources of Cyclic Hydrocarbons of World's top 3 Importers.
- Table 4 : India's top 10 Export destination of Unwrought Aluminium with their shares in percentage.
- Table 5 : World's top 10 Exporters of Unwrought Aluminium with their shares in percentage.
- Table 6 : World's top 10 Importers of Unwrought Aluminium with their shares in percentage.
- Annex-II : Top 3 sources of Unwrought Aluminium of World's top 3 Importers.
- Table 7 : India's top10 Sources of Electri Transformer, Static Converter & Inductor with their shares in percentage.
- Table 8 : World's top 10 Importers Electri Transformer, Static Converter & Inductor with their shares in percentage.
- Table 9 : India's top 10 Sources of Palm Oils and Its Fractions with their shares in percentage.
- Table 10 : World's top 10 Importers of Palm Oils and Its Fractions with their shares in percentage.

EXPORT
Cyclic Hydrocarbons

A **cyclic** hydrocarbon is a hydrocarbon in which the carbon chain joins to itself in a ring. A **cycloalkane** is a cyclic hydrocarbon in which all of the carbon-carbon bonds are single bonds. Like other alkanes, cycloalkanes are saturated compounds. Cycloalkanes have the general formula of C_nH_{2n}. The simplest cycloalkane is cyclopropane, a three-carbon ring.

The structural formulas of cyclic hydrocarbons can be represented in multiple ways, two of which are shown above. Each atom can be shown as in the structure on the left from **Figure** above. A convenient shorthand is to omit the element symbols and only show the shape, as in the triangle on the right. Carbon atoms are understood to be the vertices of the triangle.

The carbon atoms in cycloalkanes are still sp^3 hybridized, with an ideal bond angle of 109.5°. However, an examination of the cyclopropane structure shows that the triangular structure results in a C-C-C bond angle of 60°. This deviation from the ideal angle is called ring strain and makes cyclopropane a fairly unstable and reactive molecule. Ring strain is decreased for cyclobutane, with a bond angle of 90°, but is still significant. Cyclopentane has a bond angle of about 108°C. This minimal ring strain for cyclopentane makes it a more stable compound.

A cyclic compound or ring compound is a compound in which at least some its atoms are connected to form a ring. Rings vary in size from three to many tens or even hundreds of atoms. Examples of ring compounds readily include cases where:

- all the atoms are carbon (i.e., are carbocycles),
- none of the atoms are carbon (inorganic cyclic compounds), or where
- both carbon and non-carbon atoms are present (heterocyclic compounds with rings containing both carbon and non-carbon).

Common atoms can form varying numbers of bonds, and many common atoms readily form rings. In addition, depending on the ring size, the bond order of the individual links between ring atoms, and their arrangements within the rings, cyclic compounds may be aromatic or non-aromatic; in the case of non-aromatic cyclic compounds, they may vary from being fully saturated to having varying numbers of multiple bonds. As a consequence of the constitutional variability that is thermodynamically possible in cyclic structures, the number of possible cyclic structures, even of small size numbers in the many billions.

Moreover, the closing of atoms into rings may lock particular functional group–substituted atoms into place, resulting in stereochemistry and chirality being associated with the compound, including some manifestations that are unique to rings (e.g., configurational isomers); As well, depending on ring size, the three-dimensional shapes of particular cyclic structures — typically rings of five atoms and larger — can vary and interconvert such that conformational isomerism is displayed.

Cyclic Hydrocarbons may or may not exhibit aromaticity; benzene is an example of an aromatic cyclic compound, while cyclohexane is non-aromatic. In organic chemistry, the term aromaticity is used to describe a cyclic (ring-shaped), planar (flat) molecule that exhibits unusual stability as compared to other geometric or connective arrangements of the same set of atoms. As a result of their stability, it is very difficult to cause aromatic molecules to break apart and to react with other substances. Organic compounds that are not aromatic are classified as aliphatic compounds

Since one of the most commonly encountered aromatic systems of compounds in organic chemistry is based on derivatives of the prototypical aromatic compound benzene (an aromatic hydrocarbon common in petroleum and its distillates), the word “aromatic” is occasionally used to refer informally to benzene derivatives, and this is how it was first defined. Nevertheless, many non-benzene aromatic compounds exist. In living organisms, for example, the most common aromatic rings are the double-ringed bases in RNA and DNA. A functional group or other substituent that is aromatic is called an aryl group.

Because of the unique shapes, reactivities, properties, and bioactivities that they engender, cyclic compounds are the largest majority of all molecules involved in the biochemistry, structure, and function of living organisms, and in the man-made molecules (e.g., drugs, herbicides, etc.) through which man attempts to exert control over nature and biological systems

These are broadly classified under **H.S. Code-2902.**

Table – 1

India's Top 10 destination of Cyclic Hydrocarbons (H.S Code-2902)

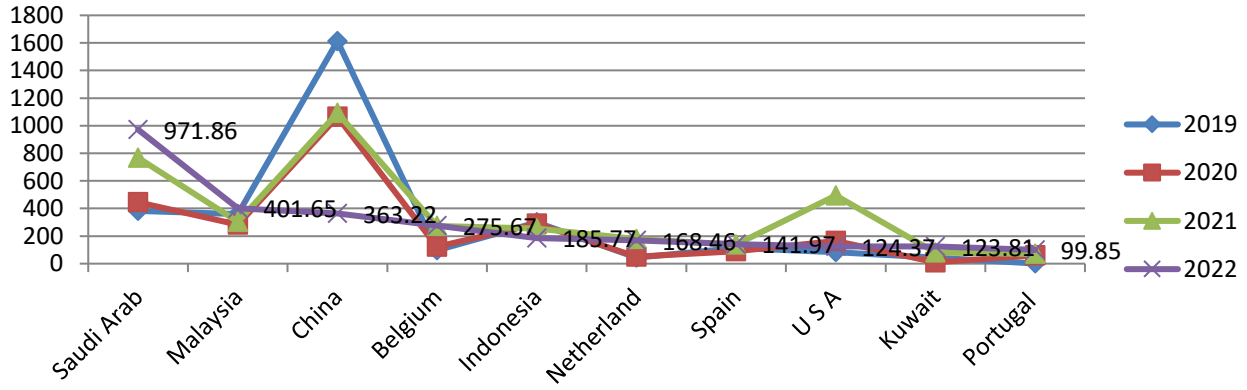
Rank	Countries	2019		2020		2021		2022	
		Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	Saudi Arab	381.79	10.89	444.47	15.88	766.98	18.59	971.86	30.16
2.	Malaysia	359.47	10.25	283.54	10.13	303.12	7.35	401.65	12.46
3.	China	1612.73	45.99	1064.95	38.06	1091.38	26.45	363.22	11.27
4.	Belgium	97.25	2.77	121.60	4.35	273.30	6.62	275.67	8.56
5.	Indonesia	299.32	8.54	288.43	10.31	254.19	6.16	185.77	5.76
6.	Netherland	43.19	1.23	49.88	1.78	178.43	4.32	168.46	5.23
7.	Spain	112.74	3.22	89.00	3.18	138.36	3.35	141.97	4.41
8.	U S A	82.99	2.37	164.50	5.88	493.36	11.96	124.37	3.86
9.	Kuwait	43.23	1.23	9.53	0.34	81.13	1.97	123.81	3.84
10.	Portugal	0.89	0.03	60.07	2.15	70.20	1.70	99.85	3.10
	Others	472.79	13.48	222.32	7.94	475.51	11.52	365.71	11.35
	Total	3506.39	100	2798.27	100	4125.95	100	3222.36	100

Source: **DGCI&S**

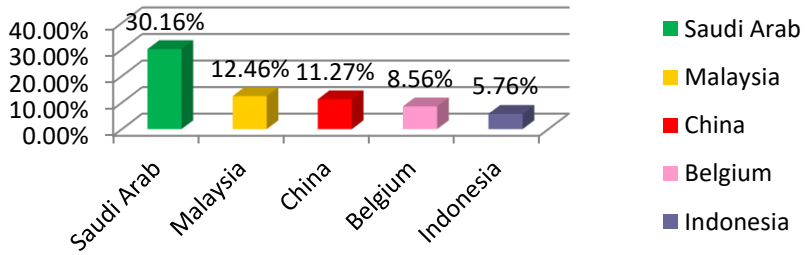
Note : India's Export including re-export

India's major destination Cyclic Hydrocarbons from 2019-2022**(Values in million USD)**

Data label given on the basis of 2022



India's top 5 destinations of Cyclic Hydrocarbons by percentage in 2022:



India Exports Cyclic Hydrocarbons was reported at US $ 3.22 Billion in 2022. This records a decrease by 21.09% from the previous year. Among the top importing countries, India exported the highest dollar worth of Cyclic Hydrocarbons to Saudi Arab with shipments in 2022 valued at US $ 971.86 Million, making up 30.16% share of India's total . In second place was Malaysia, who imported around US $ 401.65 Million worth of Cyclic Hydrocarbons or 12.46% share from India, which was followed by China, where India exported US $ 363.22 million or 11.27% share of India's total import of Cyclic Hydrocarbons in 2022.

Table - 2

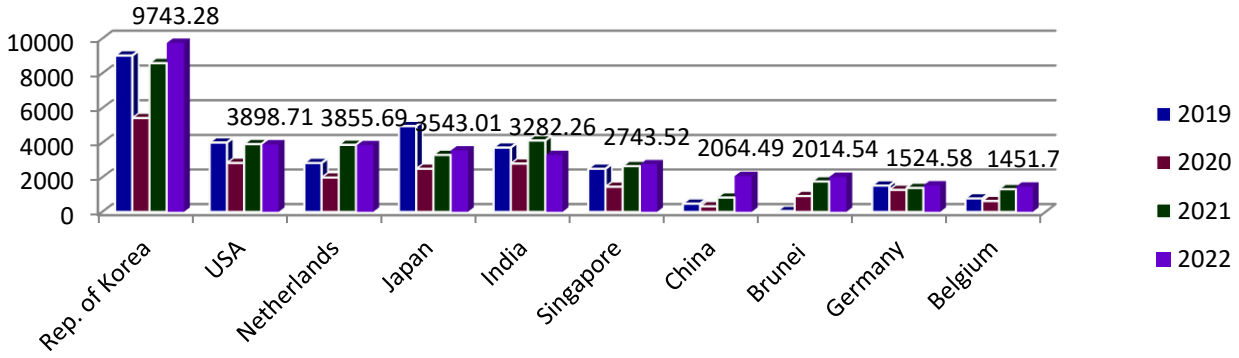
World's Top 10 exporter of Cyclic Hydrocarbons (H.S Code-2902)

Rank	Countries	2019		2020		2021		2022	
		Value (million $)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	Rep. of Korea	9021.85	21.74	5427.34	19.48	8586.94	19.65	9743.28	25.15
2.	USA	4010.83	9.66	2831.15	10.16	3920.35	8.97	3898.71	10.06
3.	Netherlands	2828.10	6.81	1985.35	7.13	3878.56	8.88	3855.69	9.95
4.	Japan	4963.41	11.96	2493.38	8.95	3290.88	7.53	3543.01	9.14
5.	**India**	**3719.42**	**8.96**	**2795.87**	**10.04**	**4129.62**	**9.45**	**3282.26**	**8.47**
6.	Singapore	2493.85	6.01	1451.82	5.21	2646.23	6.06	2743.52	7.08
7.	China	472.92	1.14	319.96	1.15	826.41	1.89	2064.49	5.33
8.	Brunei	44.41	0.11	913.73	3.28	1754.97	4.02	2014.54	5.20
9.	Germany	1519.51	3.66	1273.15	4.57	1382.83	3.16	1524.58	3.94
10.	Belgium	775.07	1.87	625.03	2.24	1309.73	3.00	1451.70	3.75
	Others	11654.87	28.08	7740.42	27.79	11967.71	27.39	4621.49	11.93
	Total	41504.23	100	27857.20	100	43694.23	100	38743.28	100

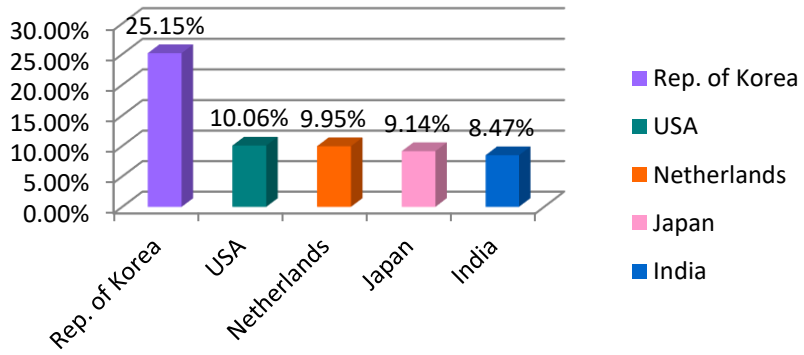
Source: **UN Comtrade**

Top world exporters of Cyclic Hydrocarbons from 2019 to 2022 **(Values in million USD)**

Data label given on the basis of 2022



Export trends in world's leading Cyclic Hydrocarbons exporters by percentage in 2022:



Cyclic Hydrocarbons exports totaled US $ 38.74 Billion in 2022. In that year the total export value decreased at an rate of 11.33% from 2021. Rep. of Korea (US $9.74 B), USA (US $ 3.90 B), Netherland (US $ 3.85 B) were the key exporters of Acyclic Hydrocarbons. Rep. of Korea represented the major exporter of Acyclic Hydrocarbons in the world, exported ,25.15% share of world export. Followed by USA and Netherland, exported 10.06% and 9.95% of Acyclic Hydrocarbons respectively in 2022. In the same year **India** exported US $ 3.28 Billion worth of Acyclic Hydrocarbons and occupied a 8.47% share of world export, which put it in 5th place in the world.

Table - 3

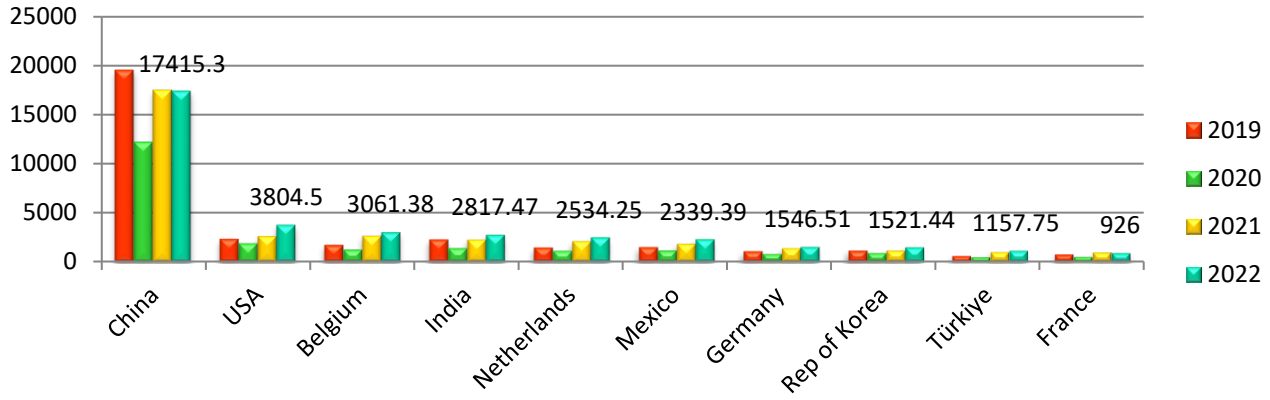
World's top 10 Importers of Cyclic Hydrocarbons (H.S Code-2902)

Rank	Countries	2019		2020		2021		2022	
		Value (million $)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	China	19577.53	44.01	12165.29	40.21	17517.79	37.33	17415.30	39.45
2.	USA	2423.43	5.45	1929.39	6.38	2680.63	5.71	3804.50	8.62
3.	Belgium	1781.19	4.00	1303.15	4.31	2718.77	5.79	3061.38	6.94
4.	**India**	**2337.36**	**5.25**	**1441.35**	**4.76**	**2308.74**	**4.92**	**2817.47**	**6.38**
5.	Netherlands	1537.74	3.46	1158.82	3.83	2162.58	4.61	2534.25	5.74
6.	Mexico	1551.60	3.49	1207.32	3.99	1876.91	4.00	2339.39	5.30
7.	Germany	1143.66	2.57	845.15	2.79	1432.40	3.05	1546.51	3.50
8.	Rep of Korea	1191.26	2.68	928.63	3.07	1207.44	2.57	1521.44	3.45
9.	Türkiye	639.30	1.44	514.08	1.70	1033.15	2.20	1157.75	2.62
10.	France	812.27	1.83	544.95	1.80	996.81	2.12	926.00	2.10
	Others	11493.43	25.83	8216.85	27.16	12993.39	27.69	7015.87	15.89
	Total	44488.78	100	30254.99	100	46928.61	100	44139.85	100

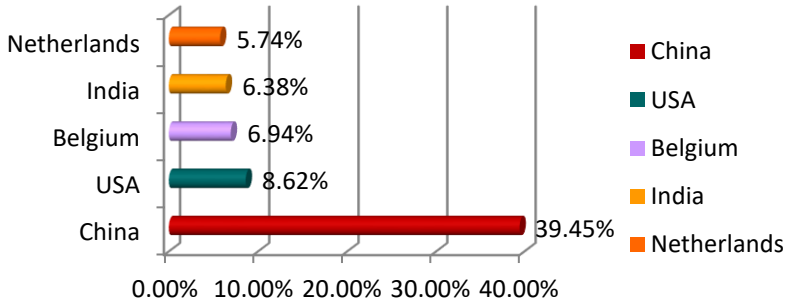
Source :UNComtrade

Top world importers of Cyclic Hydrocarbons from 2019 to 2022 **(Values in million USD)**

Data label given on the basis of 2022



Country wise leading global Importer of Cyclic Hydrocarbons by percentage in 2022

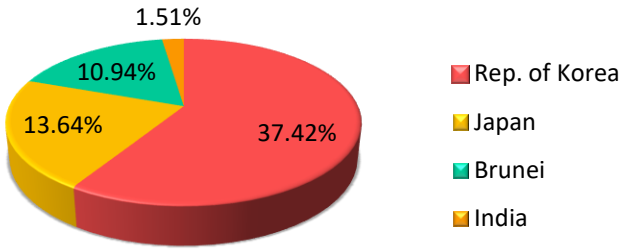


In 2022, the world imports of Cyclic Hydrocarbons was almost US $ 44.14 Billion. It was US $ 46.93 Billion in the previous year, which shows the clear decreased by almost 6% from the year 2021. In 2022 with Cyclic Hydrocarbons imported by China with imports valued at US $ 17.41 Billion, accounted for 39.45 % of world import value of it, which makes China as largest importer of the commodity group 2902 in world . USA(US $ 3.80 B) ranked in second that year, with a share of 8.62% of global import, which was followed by Belgium (US $ 3.06 B), who ranked in 3rd in the world in the same year, with 6.94% share globally. In the same year **India** imported US $ 2.82 Billion worth of Cyclic Hydrocarbons and ranked in 4th largest Importer of it in the world with 6.38% share of world import.

Annexure-II

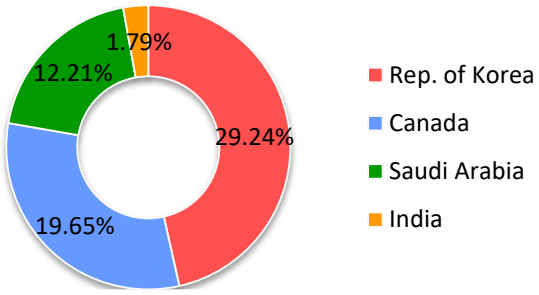
Sources of world's top three importers of Cyclic Hydrocarbon (H.S Code-2902)

i) Top 3 Sources of Cyclic Hydrocarbons to China in 2022 by percentage**:**



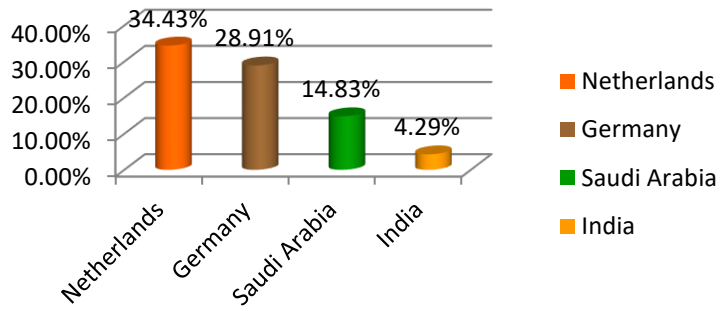
China, being the largest importer of Cyclic Hydrocarbons, imports 37.42**%** share of total from Ref. of Korea, imports of China came from Ref. of Korea,, followed by Japan (13.64%)and Brunei (10.94%) in 2022. In the same year **India** has exported 1.51% share of Cyclic Hydrocarbons, to USA. **(Source: UN Comtrade)**

ii) Top 3 Sources of Cyclic Hydrocarbons To USA in 2022 by percentage**:**



Rep. of Korea was the number one source of Cyclic Hydrocarbons to USA, USA imports 29.24% share of Cyclic Hydrocarbons from Rep. of Korea, 19.65% share from Canada and 12.21% share from Saudi Arabia in 2022. In the same year 1.79% share of Cyclic Hydrocarbons imported by USA from **India. (Source: UN Comtrade)**

iii) Top 3 Sources of Cyclic Hydrocarbons to Belgium in 2022 by percentage**:**



Netherlands was the primary source country of Cyclic Hydrocarbons to Belgium. In 2022 Belgium has imported 34.43% share of Cyclic Hydrocarbons from Netherland, 28.91% share from Germany and 14.83% share of Cyclic Hydrocarbons came from Saudi Arabia. In that year **India**'s share was 4.29% share of Belgium's total import. **(Source : UN Comtrade)**

Unwrought Aluminium

Aluminium (Al), also written aluminium, is a light silvery white metal in the periodic table's major Group 13 (IIIa, or boron group). Aluminium is the most abundant metallic element (the aluminium element) in the Earth's crust and the most prevalent nonferrous metal. Aluminium is never found in its metallic form in nature due to its chemical activity, but its compounds can be found to various extents in almost all rocks, vegetation, and animals. The aluminium atomic number is 13, the aluminium symbol is Al and Al chemical name. Let us look at more detailed information on the aluminium structure, uses properties and compounds and more from this article.

Aluminium, with the aluminium symbol, Al, is concentrated in the outer 16 km (10 miles) of the Earth's crust, where it makes up around 8% of the total weight; only oxygen and silicon come close. Aluminium is derived from the Latin word alumen, which refers to potash alum (KAl(SO4)212H2O), also known as aluminium potassium sulphate.

The discovery of aluminium was announced in 1825 by Danish physicist Hans Christian Ørsted. The first industrial production of aluminium was initiated by French chemist Henri Étienne Sainte-Claire Deville in 1856. Aluminium became much more available to the public with the Hall–Héroult process developed independently by French engineer Paul Héroult and American engineer Charles Martin Hall in 1886, and the mass production of aluminium led to its extensive use in industry and everyday life. In World Wars I and II, aluminium was a crucial strategic resource for aviation. In 1954, aluminium became the most produced non-ferrous metal, surpassing copper. In the 21st century, most aluminium was consumed in transportation, engineering, construction, and packaging in the United States, Western Europe, and Japan.

The global production of aluminium in 2016 was 58.8 million metric tons. It exceeded that of any other metal except iron (1,231 million metric tons). Small amounts of aluminium are added to certain metals to improve their qualities for specific uses of aluminium, such as aluminium bronzes and most magnesium-base alloys; or moderate amounts of other metals and silicon are added to aluminium in aluminium-base alloys. Aircraft construction, building materials, consumer durables (refrigerators, air conditioners, kitchen utensils), electrical conductors, and chemical and food-processing equipment all utilize the metal and its alloys. Commercial aluminium (99 to 99.6% pure) with modest concentrations of silicon and iron is robust and strong; pure aluminium (99.996%) is soft and weak. Aluminium is a ductile and malleable metal that may be drawn into wire or rolled into thin foil. The metal has a density of about one-third that of iron or copper. Aluminium is highly corrosion-resistant, while being chemically active, because it creates a thick, strong oxide film on its surface when exposed to air. Aluminium is a great heat and electrical conductor. It has half the heat conductivity of copper and two-thirds the electrical conductivity. It forms a face-centered cubic aluminium structure when it crystallises. Aluminum-27 is the stable isotope of all natural aluminium. Aluminium oxide and hydroxide, as well as metallic aluminium, are nontoxic. Most dilute acids attack aluminium slowly, while concentrated hydrochloric acid dissolves it quickly. Concentrated nitric acid, on the other hand, may be transferred in aluminium tank cars since it neutralises the metal. Alkalies such as sodium and potassium hydroxide attack even very pure aluminium to produce hydrogen and the aluminate ion. Finely divided aluminium will burn in carbon monoxide or carbon dioxide with the development of aluminium oxide and carbide if ignited, however aluminium is inert to sulphur at temperatures up to red heat due to its high affinity for oxygen. By using emission spectroscopy, aluminium can be detected in quantities as low as one part per million.

These are broadly classified under **H.S. Code-7601**

Table - 4

India's Top 10 destination of Unwrought Aluminium (HS Code –7601)

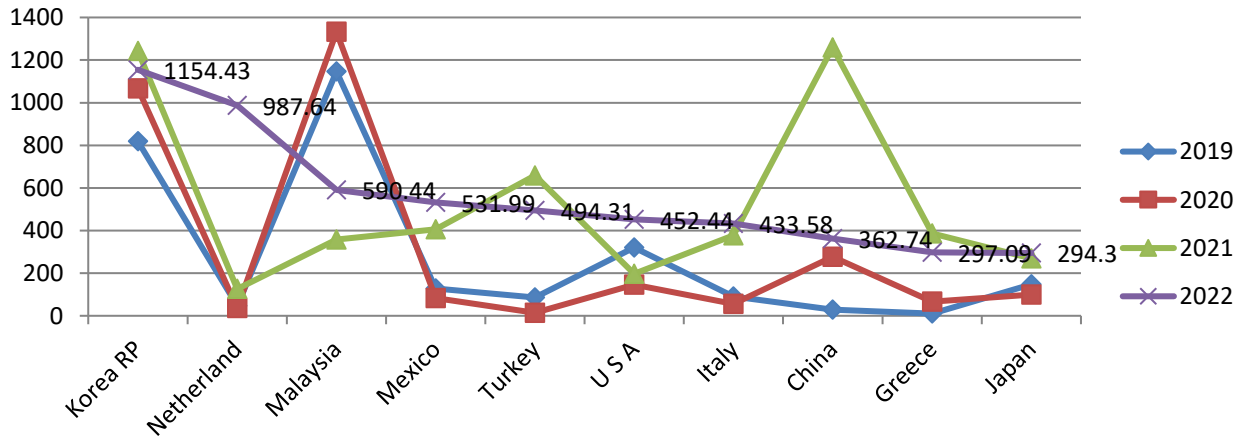
Rank	Countries	2019		2020		2021		2022	
		Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	Korea RP	819.49	21.86	1066.33	26.88	1243.01	17.74	1154.43	15.39
2.	Netherland	46.41	1.24	35.93	0.91	125.83	1.80	987.64	13.17
3.	Malaysia	1146.13	30.58	1332.28	33.59	358.40	5.11	590.44	7.87
4.	Mexico	127.53	3.40	83.35	2.10	405.13	5.78	531.99	7.09
5.	Turkey	85.86	2.29	14.14	0.36	658.41	9.40	494.31	6.59
6.	U S A	320.57	8.55	145.55	3.67	196.31	2.80	452.44	6.03
7.	Italy	89.64	2.39	56.29	1.42	377.19	5.38	433.58	5.78
8.	China	28.08	0.75	277.22	6.99	1258.99	17.97	362.74	4.84
9.	Greece	10.21	0.27	65.73	1.66	386.71	5.52	297.09	3.96
10.	Japan	147.81	3.94	98.99	2.50	269.84	3.85	294.30	3.92
	Others	926.58	24.72	790.66	19.93	1727.27	24.65	1901.70	25.35
	Total	3748.30	100	3966.49	100	7007.09	100	7500.66	100

Source: **DGCI&S**

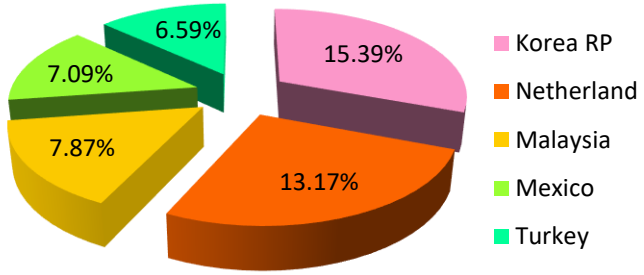
Note : India's Export including re-export

Major destinations of Indian Unwrought Aluminium from 2019 to 2022 **(in million USD)**

Data label given on the basis of 2022



India's top 5 major destinations of Unwrought Aluminium by percentage in 2022:



Unwrought Aluminium exported from India was worth a total US $ 7.50 billion in 2022, up by 7.04% from $7.01 billion in 2021. Unwrought Aluminum is exported from India majorly to Korea RP, Netherlands and to Malaysia. In 2022 India has exported US $ 1.15 Billion of Unwrought Aluminum to Korea RP, which holds the top position with the share of 15.39% of the total export of India. With the share of 13.17% and 7.87%, Netherland (US $ 987.64 M) and Malaysia (US $ 590.44 M) takes runner up and 2nd runner up position in the global importers Unwrought Aluminum from India.

Up to the 2020 Malaysia was the largest destination country of Unwrought Aluminium from India.

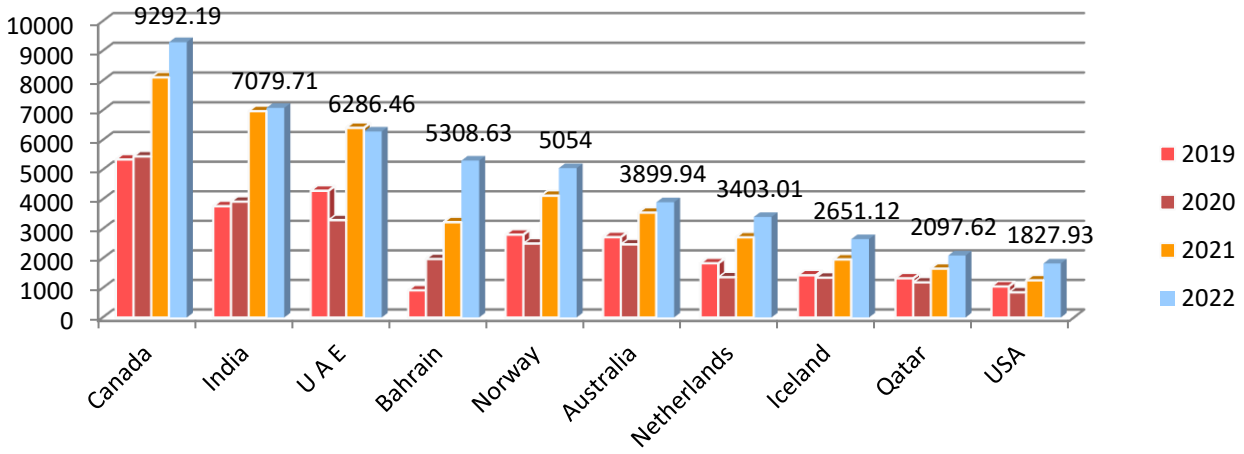
Table - 5

World's Top 10 exporters of Unwrought Aluminium (HS Code –7601)

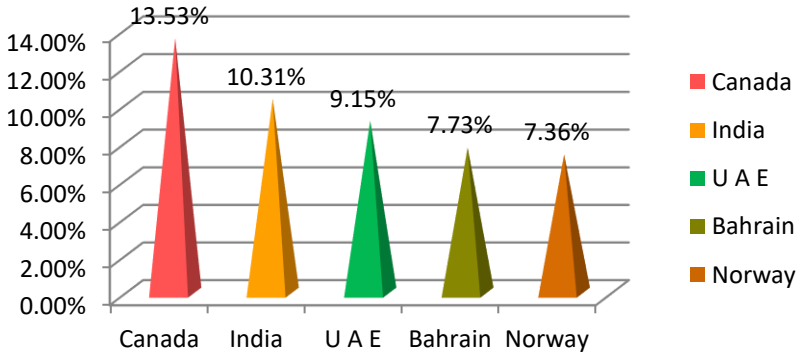
Rank	Countries	2019		2020		2021		2022	
		Value (million $)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	Canada	5345.65	11.31	5449.87	12.02	8108.66	11.04	9292.19	13.53
2.	**India**	**3766.63**	**7.97**	**3919.97**	**8.65**	**6972.39**	**9.50**	**7079.71**	**10.31**
3.	U A E	4289.76	9.08	3293.59	7.27	6411.25	8.73	6286.46	9.15
4.	Bahrain	918.47	1.94	1979.04	4.37	3225.77	4.39	5308.63	7.73
5.	Norway	2803.89	5.93	2503.87	5.52	4122.54	5.61	5054.00	7.36
6.	Australia	2718.91	5.76	2475.07	5.46	3548.16	4.83	3899.94	5.68
7.	Netherlands	1835.65	3.89	1362.87	3.01	2713.66	3.70	3403.01	4.96
8.	Iceland	1428.97	3.02	1348.34	2.97	1965.06	2.68	2651.12	3.86
9.	Qatar	1326.11	2.81	1187.80	2.62	1652.47	2.25	2097.62	3.05
10.	USA	1050.38	2.22	852.08	1.88	1257.55	1.71	1827.93	2.66
	Others	21759.52	46.06	20957.99	46.23	33448.07	45.55	21768.98	31.70
	Total	47243.92	100	45330.47	100	73425.57	100	68669.59	100

Source :**UN Comtrade**

Leading Unwrought Aluminium exporters of world from 2019 to 2022 **(Values in million $)**
Data label given on the basis of 2022



Country wise export trends of Unwrought Aluminium by percentage in 2022:



The total global export value of Unwrought Aluminium was US $ 68.67 Billion in 2022 which was briefly down by 6.47% from the year 2021. Canada was the largest exporter of Unwrought Aluminium in the world in 2022, exported US $ 9.29 Billion or 13.53% share of World export of the commodity in that year. **India** became the 2nd largest exporter of it with export worth value of US $ 7.08 Billion or 10.31% of world export in the same year. Which was followed by UAE with the value US $ 6.29 Billion or 9.15% share .

Table - 6

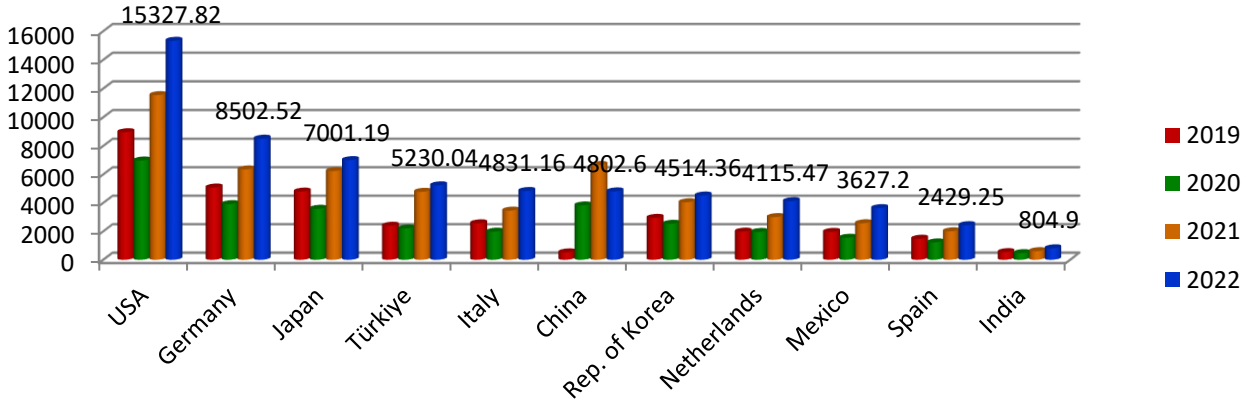
World's Top 10 Importers of Unwrought Aluminium (HS Code –7601)

Rank	Countries	2019		2020		2021		2022	
		Value (million $)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	USA	8954.04	16.98	6973.44	14.31	11538.57	14.91	15327.82	18.35
2.	Germany	5076.88	9.63	3908.37	8.02	6345.56	8.20	8502.52	10.18
3.	Japan	4790.82	9.09	3582.81	7.35	6229.74	8.05	7001.19	8.38
4.	Türkiye	2391.70	4.54	2199.42	4.51	4773.02	6.17	5230.04	6.26
5.	Italy	2561.97	4.86	1974.20	4.05	3451.64	4.46	4831.16	5.79
6.	China	519.95	0.99	3817.82	7.84	6655.99	8.60	4802.60	5.75
7.	Rep. of Korea	2944.24	5.58	2527.21	5.19	4040.36	5.22	4514.36	5.41
8.	Netherlands	1977.75	3.75	1954.20	4.01	2997.36	3.87	4115.47	4.93
9.	Mexico	1958.06	3.71	1544.94	3.17	2564.48	3.31	3627.20	4.34
10.	Spain	1478.89	2.81	1219.41	2.50	1999.86	2.58	2429.25	2.91
21.	**India**	**537.69**	**1.02**	**463.74**	**0.95**	**604.39**	**0.78**	**804.90**	**0.96**
	Others	19526.31	37.04	18556.31	38.09	26198.28	33.85	22323.69	26.73
	Total	52718.31	100	48721.86	100	77399.24	100	83510.20	100

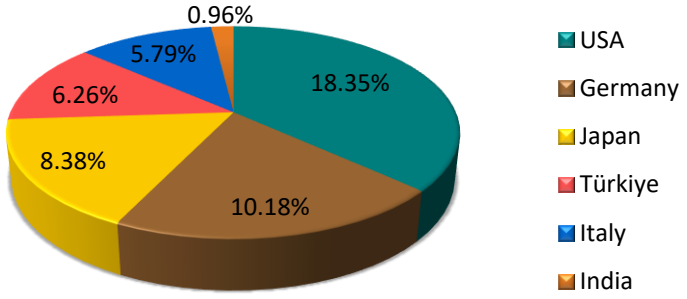
Source :UN **Comtrade**

Unwrought Aluminium importers of world from 2019 to 2022 **(in million USD)**

Data label given on the basis of 2022



Country wise import trends of Unwrought Aluminium by percentage in 2022

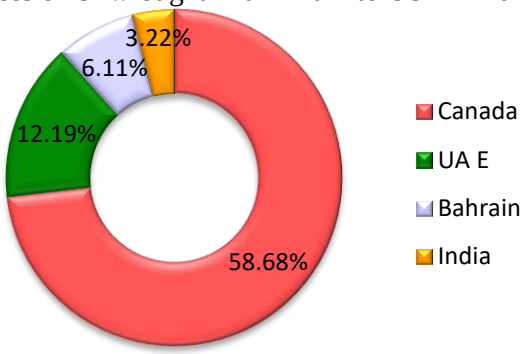


World Import of Unwrought Aluminium amounted to US $ 83.51 Billion in 2022. In 2022 the total imports value increased at US $ 6.11 Billion or 7.90% over the year 2021. Unwrought Aluminium imports attained its maximum level of US $ 83.51 Billion in 2022. USA (US $ 15.33B) appeared as largest importer of Unwrought Aluminium with 18.35% share of global total import in 2022, Germany (US $ 8.50 B) obtained the 2nd position with 10.18% share and Japan (US $ 7B) was in the 3rd position with 8.38% share in 2022. **India**'s import of the commodity was US $ 804.90 million or 0.96% share of world's import in that year.

Annexure-II

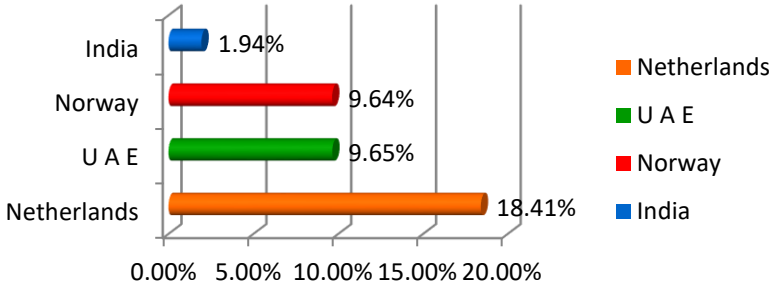
Top sources of world's top 3 importers of Unwrought Aluminium (HS Code –7601)

(i) Top 3 Sources of Unwrought Aluminium to USA in 2022 by percentage:



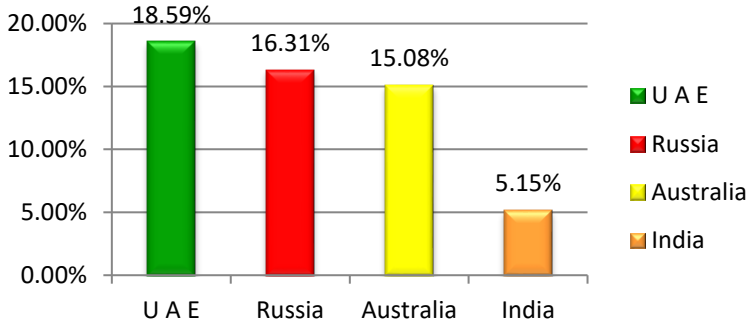
Canada was the principle source country of Unwrought Aluminium to USA in 2022. USA imported over 58.68% share of Unwrought Aluminium from Canada, in the same year UAE (12.19%) & Bahrain (6.11%) were 2nd and 3rd major source countries of Unwrought Aluminium to USA. In that year **India**'s share was only 3.22% share of USA's total import of Unwrought Aluminium. **(Source: UN Comtrade)**

(ii) Top 3 Sources of Unwrought Aluminium to Germany in 2022 by percentage**:**



Germany's 3 major source countries of Unwrought Aluminium in 2022 were Netherlands (18.41%), UAE (9.65%) and Norway (9.64%). In 2022 **India** exported 1.94% share of Germany's total import of Unwrought Aluminium **(Source: UN Comtrade)**

(iii) Top 3 Sources of Unwrought Aluminium to Japan in 2022 by percentage**:**



18.59% share of Unwrought Aluminium imports of Japan came from UAE in 2022, which was followed by Russia (16.31 %) and Australia (15.08%). **India** has exported 5.15% share of Japan's total import of Unwrought Aluminium in 2022. **(Source : UN Comtrade).**

IMPORT

Electrical Transformer, Static Converter & Inductor

A **transformer** is a passive component that transfers electrical energy from one electrical circuit to another circuit, or multiple circuits. A varying current in any coil of the transformer produces a varying magnetic flux in the transformer's core, which induces a varying electromotive force (EMF) across any other coils wound around the same core. Electrical energy can be transferred between separate coils without a metallic (conductive) connection between the two circuits. Faraday's law of induction, discovered in 1831, describes the induced voltage effect in any coil due to a changing magnetic flux encircled by the coil.

Transformers are used to change AC voltage levels, such transformers being termed step-up or step-down type to increase or decrease voltage level, respectively. Transformers can also be used to provide galvanic isolation between circuits as well as to couple stages of signal-processing circuits. Since the invention of the first constant-potential transformer in 1885, transformers have become essential for the transmission, distribution, and utilization of alternating current electric power. A wide range of transformer designs is encountered in electronic and electric power applications. Transformers range in size from RF transformers less than a cubic centimeter in volume, to units weighing hundreds of tons used to interconnect the power grid.

Transformers for use at power or audio frequencies typically have cores made of high permeability silicon steel. The steel has a permeability many times that of free space and the core thus serves to greatly reduce the magnetizing current and confine the flux to a path which closely couples the windings. Early transformer developers soon realized that cores constructed from solid iron resulted in prohibitive eddy current losses, and their designs mitigated this effect with cores consisting of bundles of insulated iron wires. Later designs constructed the core by stacking layers of thin steel laminations, a principle that has remained in use.

In all fields of electrical engineering, **power conversion** is the process of converting electric energy from one form to another. A **power converter** is an electrical or electro-mechanical device for converting electrical energy. A power converter can convert alternating current (AC) into direct current (DC) and vice versa; change the voltage or frequency of the current or do some combination of these. The power converter can be as simple as a transformer or it can be a far more complex system, such as a resonant converter. The term can also refer to a class of electrical machinery that is used to convert one frequency of alternating current into another. Power conversion systems often incorporate redundancy and voltage regulation.

Power converters are classified based on the type of power conversion they do. One way of classifying power conversion systems is according to whether the input and output are alternating current or direct current. Finally, the task of all power converters is to "process and control the flow of electrical energy by supplying voltages and currents in a form that is optimally suited for user loads".

An **inductor**, also called a **coil**, **choke**, or **reactor**, is a passive two-terminal electrical component that stores energy in a magnetic field when electric current flows through it.[1] An inductor typically consists of an insulated wire wound into a coil.

When the current flowing through the coil changes, the time-varying magnetic field induces an electromotive force (voltage) in the conductor, described by Faraday's law of induction. According to Lenz's law, the induced voltage has a polarity (direction) which opposes the change in current that created it. As a result, inductors oppose any changes in current through them.

Inductors are used extensively in analog circuits and signal processing. Applications range from the use of large inductors in power supplies, which in conjunction with filter capacitors remove ripple which is a multiple of the mains frequency (or the switching frequency for switched-mode power supplies) from the direct current output, to the small inductance of the ferrite bead or torus installed around a cable to prevent radio frequency interference from being transmitted down the wire. Inductors are used as the energy storage device in many switched-mode power supplies to produce DC current. The inductor supplies energy to the circuit to keep current flowing during the "off" switching periods and enables topographies where the output voltage is higher than the input voltage.

These are broadly classified under **H. S. Code- 8504**.

Table - 7

India's Top 10 Sources of Electrical Transformer, Static Converter etc. (H. S.-8504)

Rank	Countries	2019		2020		2021		2022	
		Value (million $)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	China	912.52	41.37	873.81	46.08	1337.46	51.60	1451.48	51.84
2.	Hong Kong	232.05	10.52	198.95	10.49	236.43	9.12	216.84	7.74
3.	Germany	216.32	9.81	128.30	6.77	175.95	6.79	191.61	6.84
4.	Singapore	119.85	5.43	101.27	5.34	108.92	4.20	163.31	5.83
5.	U S A	84.49	3.83	65.14	3.43	76.54	2.95	91.94	3.28
6.	Vietnam	58.16	2.64	43.26	2.28	68.48	2.64	84.56	3.02
7.	Japan	95.61	4.33	60.70	3.20	90.12	3.48	84.35	3.01
8.	Korea RP	52.00	2.36	44.75	2.36	56.89	2.19	82.06	2.93
9.	Italy	41.08	1.86	32.38	1.71	45.64	1.76	45.38	1.62
10.	Finland	42.90	1.94	30.72	1.62	38.56	1.49	41.22	1.47
	Others	350.81	15.90	317.21	16.73	357.00	13.77	347.40	12.41
	Total	2205.78	100	1896.48	100	2591.98	100	2800.14	100

Source: **DGCI&S**

Note : India's Import including Re-import

The value of imports of Electrical Transformer, Static Converter and Inductor to India totalled US $ 2.8 billion in 2022. Sales of Electrical Transformer, Static Converter and Inductor to India went up by 8.03% compared to 2021, imports of Electrical Transformer, Static Converter and Inductor went up by US $ 208.16 million from 2021. China (US $ 1.45 B) constitutes the largest source of it to India with 51.84% share of India's total import of Electrical Transformer, Static Converter and Inductor in 2022, which was followed by Hong Kong (US $ 216.84 M) and Germany (US $ 191.61M) with 7.74% and 6.84% share respectively.

Table - 8

World Top 10 Importer of Electrical Transformer, Static Converter etc. (H. S.-8504)

Rank	Countries	2019		2020		2021		2022	
		Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	USA	15094.40	14.92	16145.72	15.58	18972.20	15.17	23428.79	18.01
2.	China	11729.35	11.60	11554.08	11.15	13756.18	11.00	12168.65	9.35
3.	Germany	7002.48	6.92	7897.78	7.62	10062.37	8.05	11767.26	9.05
4.	Hong Kong	8113.03	8.02	7947.38	7.67	9489.67	7.59	7777.62	5.98
5.	Mexico	3996.45	3.95	3781.29	3.65	4573.65	3.66	5636.13	4.33
6.	Netherlands	3015.48	2.98	3276.52	3.16	4221.04	3.37	5469.54	4.20
7.	Japan	3195.73	3.16	3265.35	3.15	3811.38	3.05	4282.54	3.29
8.	Italy	1846.46	1.83	1837.45	1.77	2599.44	2.08	3777.04	2.90
9.	U K	2321.25	2.30	2159.48	2.08	2479.21	1.98	3685.56	2.83
10.	France	2359.53	2.33	2367.04	2.28	2996.11	2.40	3650.89	2.81
12.	**India**	**2208.20**	**2.18**	**1897.19**	**1.83**	**2587.97**	**2.07**	**2805.07**	**2.16**
	Others	40257.11	39.80	41531.54	40.06	49523.31	39.60	45645.14	35.09
	Total	101139.47	100	103660.81	100	125072.53	100	130094.25	100

Source :UN Comtrade

The worth value of Global import of Electrical Transformer, Static Converter and Inductor was nearly US $ 130.09 Billion in 2022 which was rise up by 4.01 % from the year 2021. USA has became the world's largest importer of Electrical Transformer, Static Converter and Inductor among world's largest importers. Imports US $ 23.43 Billion or 18.01% share of world's import of Electrical Transformer, Static Converter and Inductor in 2022. China (US $ 12.17 B) constitutes the 2nd largest importer in the world with 9.35% which was followed by Germany (US $ 11.77 B) with 9.05% share of total world import trade value of Electrical Transformer, Static Converter and Inductor.

Palm Oil and Its Fractions

Palm oil is an edible vegetable oil derived from the mesocarp (reddish pulp) of the fruit of the oil palms. The oil is used in food manufacturing, in beauty products, and as biofuel. Palm oil accounted for about 33% of global oils produced from oil crops in 2014. Palm oils are easier to stabilize and maintain quality of flavor and consistency in processed foods, so are frequently favored by food manufacturers. On average globally, humans consumed 7.7 kg (17 lb) of palm oil per person in 2015. Demand has also increased for other uses, such as cosmetics and biofuels, creating more demand on the supply encouraging the growth of palm oil plantations in tropical countries.

The use of palm oil has attracted the concern of environmental groups due to deforestation in the tropics where palms are grown, and has been cited as a factor in social problems due to allegations of human rights violations among growers. An industry group formed in 2004 to create more sustainable and ethical palm oil, through the Roundtable on Sustainable Palm Oil. However, very little palm oil is certified through the organization, and some groups have criticized it as greenwashing. In 2018, a report by the International Union for Conservation of Nature acknowledged that palm oil is much more efficient than other oils in terms of land and water usage; however, deforestation causes more biodiversity loss than switching to other oils. The biggest producers of palm oil are Indonesia, Malaysia, Thailand, and Nigeria. Indonesia produces biodiesel primarily from palm oil.

Humans used oil palms as far back as 5,000 years. In the late 1800s, archaeologists discovered a substance that they concluded was originally palm oil in a tomb at Abydos dating back to 3,000 BCE. Palm oil from Elaeis guineensis has long been recognized in West and Central African countries, used widely as a cooking oil.

Palm oil is naturally reddish in color because of a high beta-carotene content. It is not to be confused with palm kernel oil derived from the kernel of the same fruit or coconut oil derived from the kernel of the coconut palm. The differences are in color (raw palm kernel oil lacks carotenoids and is not red), and in saturated fat content: palm mesocarp oil is 49% saturated, while palm kernel oil and coconut oil are 81% and 86% saturated fats, respectively. However, crude red palm oil that has been refined, neutralized, bleached and deodorized, a common commodity called RBD (refined, bleached, and deodorized) palm oil, does not contain carotenoids. Many industrial food applications of palm oil use fractionated components of palm oil (often listed as "modified palm oil") whose saturation levels can reach 90%; these "modified" palm oils can become highly saturated, but are not necessarily hydrogenated.

After milling, various palm oil products are made using refining processes. First is fractionation, with crystallization and separation processes to obtain solid (palm stearin), and liquid (olein) fractions. Then melting and degumming removes impurities. Then the oil is filtered and bleached. Physical refining removes smells and coloration to produce "refined, bleached and deodorized palm oil" (RBDPO) and free fatty acids, which are used in the manufacture of soaps, washing powder and other products. RBDPO is the basic palm oil product sold on the world's commodity markets. Many companies fractionate it further to produce palm oil for cooking oil, or process it into other products. The highly saturated nature of palm oil renders it solid at room temperature in temperate regions, making it a cheap substitute for butter or hydrogenated vegetable oils in uses where solid fat is desirable, such as the making of pastry dough and baked goods. Palm oil is used in West African cuisine such as egusi soup and okra soup. The health concerns related to trans fats in hydrogenated vegetable oils may have contributed to the increasing use of palm oil in the food industry. Palm oil is sometimes used as a minor ingredient in calf milk replacer.

Palm oil is pervasively used in personal care and cleaning products, and it provides the foaming agent in nearly every soap, shampoo, or detergent. Around 70% of personal care products including soap, shampoo, makeup, and lotion, contain ingredients derived from palm oil. In 2018–2019, world production of palm oil was 73.5 million metric tons. During the 2022 food crises instigated by the Russian invasion of Ukraine and crop failures in other parts of the world due to extreme weather caused by climate change, the Indonesian government banned exports of palm oil. This combined with a reduced harvest in Malaysia greatly increased global prices, while reducing availability causing ripple effects in the global supply chain. On 23 May 2022, the Indonesian government reopened trading hoping to balance supplies.

These are broadly classified under **H. S. Code - 1511**.

Tab le - 9

India's Top 10 Sources of Palm Oil & its Fractions (HS Code :1511)

Rank	Countries	2019		2020		2021		2022	
		Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	Indonesia	2624.64	48.38	3217.75	62.96	3944.46	41.21	5501.47	47.07
2.	Malaysia	2229.97	41.11	1518.32	29.71	4052.17	42.34	3873.18	33.14
3.	Thailand	89.63	1.65	111.87	2.19	583.42	6.10	1223.95	10.47
4.	Singapore	242.56	4.47	203.79	3.99	419.15	4.38	436.33	3.73
5.	Papua N Gna	5.78	0.11	4.27	0.08	241.96	2.53	416.89	3.57
6.	Nepal	196.36	3.62	47.23	0.92	234.31	2.45	174.02	1.49
7.	Cote D' Ivorie	0.00	0.00	0.00	0.00	32.87	0.34	21.14	0.18
8.	Cambodia	0.65	0.01	2.66	0.05	15.25	0.16	17.55	0.15
9.	Philippines	0.00	0.00	0.00	0.00	6.70	0.07	12.80	0.11
10.	Liberia	0.00	0.00	0.00	0.00	3.34	0.03	7.79	0.07
	Others	35.26	0.65	5.21	0.10	37.10	0.39	3.51	0.03
	Total	5424.85	100	5111.09	100	9570.70	100	11688.61	100

Source: **DGCI&S**

Note : India's Import including re-import

There is a total of 31 countries India imports Palm Oil and its Fractions from in 2022. The dollar value of Palm Oil and its Fractions import in 2022 stood at US $ 11.69 Billion and US $ 9.57 Billion in 2021, which shows a growth of 22.13% from the previous year's import value. Among the top importing countries, India imported the highest dollar worth of Palm Oil and its Fractions from Indonesia with shipments in 2022 valued at US $ 5.50 Billion, making up 47.07% share of India's total. In second source country was Malaysia, from which India imported around US $ 3.87 Billion worth of Palm Oil and its Fractions or 33.14%, which was followed by Thailand (US $ 1.22 B) or 10.47% share of India's total import of Palm Oil and its Fractions in 2022.

Table – 10

World Top 10 Importer of Palm Oil & its Fractions (HS Code :1511)

Rank	Countries	2019		2020		2021		2022	
		Value (million $)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	**India**	**5408.89**	**19.15**	**5119.26**	**16.36**	**9568.46**	**20.25**	**11728.74**	**25.42**
2.	China	4108.82	14.54	4123.76	13.18	5946.08	12.58	5842.21	12.66
3.	USA	1014.30	3.59	1091.72	3.49	1806.35	3.82	2420.58	5.25
4.	Netherlands	1671.37	5.92	1770.57	5.66	2101.62	4.45	2132.33	4.62
5.	Italy	1037.22	3.67	1246.58	3.98	1485.44	3.14	1801.04	3.90
6.	Malaysia	549.22	1.94	657.67	2.10	1148.70	2.43	1453.88	3.15
7.	Spain	1168.31	4.14	1396.58	4.46	1527.35	3.23	1385.07	3.00
8.	Philippines	34.57	0.12	55.92	0.18	598.87	1.27	1323.97	2.87
9.	Türkiye	416.15	1.47	527.27	1.69	798.19	1.69	1206.32	2.61
10.	Germany	517.75	1.83	626.47	2.00	771.81	1.63	1175.43	2.55
	Others	12323.28	43.62	14670.91	46.89	21510.22	45.51	15673.55	33.97
	Total	28249.90	100	31286.70	100	47263.09	100	46143.12	100

Source :**UNComtrade**

The world's most consumed cooking oil, international purchases of imported Palm Oil and its Fractions cost a total US $ 46.14 billion in 2022. Year over year, globally imported palm oil decreased by 2.37% compared to US $ 47.26 billion during 2021. India's global purchases of imported palm oil totaled US$11.73 billion in 2022, became the world largest importer of Palm Oil and its Fractions with the 25.42% share of global total. In that year the 2nd largest importer of Palm Oil and its Fractions was China, imported US $ 5.84 Billion worth of it or 12.66% share of global total and the 3rd position in ranking was occupied by USA, imports US $ 2.42 billion worth of Palm Oil and its Fractions which was accounted 5.25% share in 2022.