Turkish Rubber Industry Follow-Up Report 2017

PAGEV

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PREFACE

The plastic industry is one of the most important actors of the Turkish economy. Today. the contribution of the plastics industry to the country's economy is gradually increasing with the total production exceeding 9 million tons. and 35 billion dollars' worth of turnover. the approaching direct exports of 5 billion dollars and the annual growth of 12% for the last 10 years.

Our industry. with its production capacity. has reached the second place in Europe and the sixth place in the world. As PAGEV. we continue to lead the industry successfully in the framework of the "Unifying Power" mission of the Turkish Plastics Industry.

We also know that having the right and reliable data and information is the most important part of the solution when we sign the indispensability of Plastics in our lives and sign our work to tackle our industrial problems with concrete steps based on scientific evidence. In this direction we constantly investigate collect new data compile and report them. We present our reports that we believe are important for the development of our industry and our booklets containing important information to the plastics industry representatives. stakeholders and public institutions.

As PAGEV. we prepared a report set that will contribute to the industry in a serious way in the face of our long and dedicated researches. With our reports, we made booklets with the comments of our expert reporters about the point where the Turkish Plastics Industry is in the right and reliable light common problems and what should be the search for concrete solutions. We believe that our reports and information set will benefit all of our stakeholders especially our members and will guide the plastics world. At the same time we are pleased that our public institutions have reached the most up-to-date and accurate information about the plastics industry.

On the other hand with our sector reports in English we think that our colleagues will be able to share the potential of our country's plastics industry with the most up-to-date business partners in the global marketplace.

Hereby presenting our current reports and information files relating with our industry we would like to thank all of our colleagues who have contributed to this day's achievement of our industry who has taken a position as a locomotive mission in the development of our country.

Best regards,

Yavuz EROĞLU
PAGEV President

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EXECUTIVE SUMMARY

Rubber is one of the important sectors of Turkish chemistry and manufacturing industries and has a share of 1.4% in the world total rubber exports and 1.3% imports. Raw material is almost exclusively dependent on imports. Although rubber industry is directly exporting. It has also indirect exports with the channels of mainly automotive. With these direct and indirect exports it provides the economy over 4 billion dollars of foreign currency inflows.

Rubber industry production is increasing or decreasing in parallel with the development in many sectors. especially automotive.

Rubber end products production in the last 5 years has increased by 6.7% on average per year on amount basis while production value has decreased by 1.7% in the same period. In the mentioned period the annual rate of increase in imports realized as 4.3% on amount and 0.1% on value basis while the rate of decrease in exports was 6.4% on amount and 0.4% on value basis. The increase in production during the period of 2013-2017 is due to the increase in domestic consumption. As a matter of fact domestic consumption in this period has increased by 5.5% on amount and by 1.8% on value basis.

In rubber end products industry while 499 million dollars of foreign trade surplus was given. 72% on amount and 64% of on value basis of production was exported and 62% of on amount and 58% of on value basis of domaestic consumption was coverde by imports in 2017.

Although it is totally dependent on raw materials imports the industry exports rubber end products to the countries such as Germany, Italy, Spain, France, England and USA by converting the raw materials into high value added end products.

1. SECTOR'S DEFINITION

Rubber S; covers a wide range of fields such as the production of synthetic rubber and the products obtained by using these materials and also marketing. distribution and storage of these products. The rubber products industry is predominantly a sector that produces intermediate goods.

Rubber products are mainly used in various industries such as automotive, construction, aviation, health, mining, machinery, clothing, shoemaking, office supplies, furniture and toys and so on. Rubber is the raw material of many products such as pipes, hoses, conveyor belts, belt, Seals, vibrating dampers, bellows in moving mechanisms;

The most common is the use of transportation means in tires as well as many other types of inland rubber products such as shoe soles, fittings, seals and so on. Another feature of the sector is that it is the final product because many of its products are directed to the renewal market at the same time. In the NACE 1 grouping the rubber products are assembled under the code 251 of manufacture. Rubber products manufacturing industry sub-sectors;

2511 Manufacture of inner and outer tires
2512 Backing and reworking of tires
2513 Other rubber products are listed as manufactured

The HS code of 40 (Turkish Customs Tariff Schedule) covers 'Rubber and Rubber Goods'. In this group materials between 4001 and 4007 indicate rubber raw material while materials between 4008 and 4017 indicate finished rubber products.

Rubber Raw Materials	Rubber End Products
40.01- Natural rubber	**40.08**- Plate.sheet.strip.rods of vulcanised rubber other than hard rubber
40.02- Synthetic rubber factice from oil	**40.09** – Tubes. pipes & hoses of vulcanised rubber other than hard rubber
40.03- Reclaimed rubber in primary forms or in plates. sheets or strip	**40.10**- Conveyor or transmission belts or belting of vulcanised rubber
40.04- Waste.parings&scrap (excl. hard rubber)&powder/granule obtained therefore	**40.11**- New pneumatic tires. of rubber
40.05- Compounded rubber.unvulcanised.in primary forms	40.12- Retreaded/used tire; solid tire. interchangeable tire treads& flaps
40.06- Rubber unvulcanised form & articles nes. excl. rods. tubes. discs	**40.13**- Inner tubes of rubber 40.14 -Articles of apparel clothing accessories of vulcanised rubber
40.07- Vulcanised rubber thread and cord	**40.15-** Hygienic/pharmaceutical art of vulcanised rubber **40.16**- Articles of vulcanised rubber o/t hard rubber. nes **4017**- Hard rubber in all forms. including waste&scrap;articles of hard rubber

Table 1: Industry Definition by HS Codes
Source: Turk Stat and ITC Trade Statistics

2. RUBBER END PRODUCTS INDUSTRY

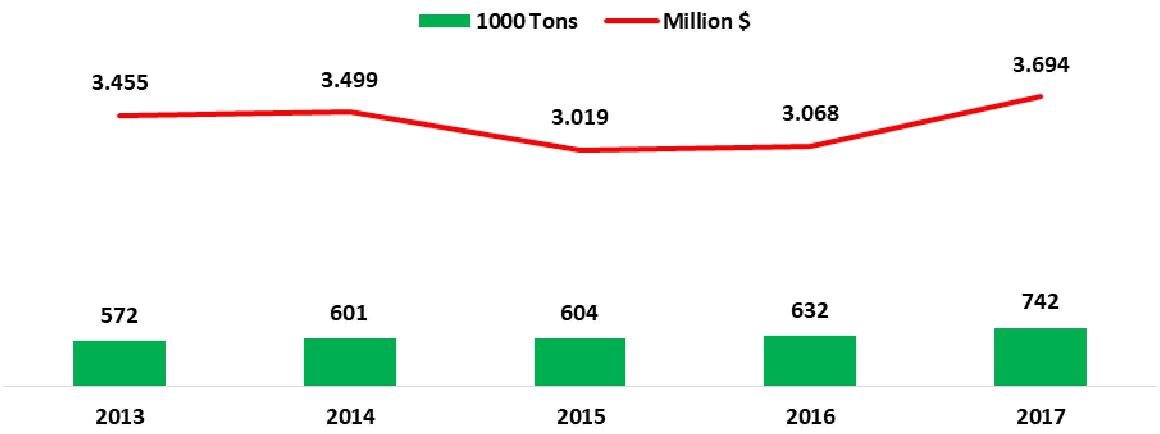
2.1. PRODUCTION

Rubber end products production having been 572 thousand tons and 3 billion 455 million dollars in 2013 reached up 742 thousand tons and 3 billion 694 million dollars in 2017 with an annual increase of 6.7% on amount and 1.7% on value basis for the last five years.

Rubber end products production increased by 17.5% on amount and by 20.4% on value basis in 2017 compared to 2016.

	2013	2016	2017	CAGR % 2013- 2017	% Increase 2017/ 2016
1000 Tons	572	632	742	6.7	17.5
Million $	3,455	3,068	3,694	1.7	20.4

Table 2: Rubber End Products Production
Source: Turk Stat and ITC Trade Statistics



Graphic 1: Rubber End Products Production
Source: Turk Stat and ITC Trade Statistics

2.2. FOREIGN TRADE

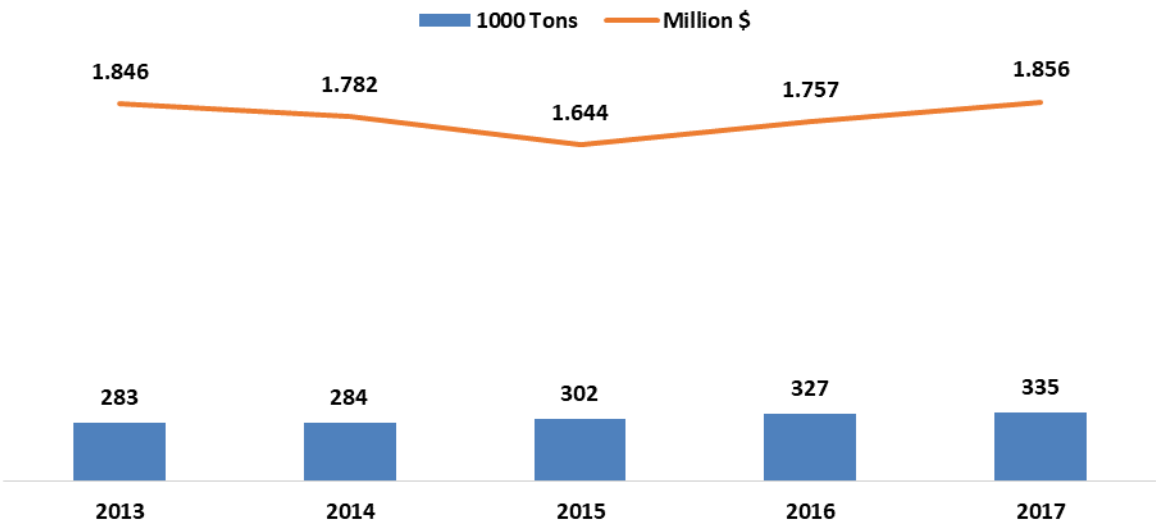
2.2.1. IMPORTS

Rubber end products imports. having been 283 thousand tons and 1 billion 846 million dollars in 2013 reached up 335 thousand tons and 1 billion 856 million dollars in 2017 with an annual increase of 4.3% on amount and 0.1% on value basis for the last five years.

Rubber end products imports increased by 2.2% on amount and 5.6% on value basis in 2017 compared to 2016.

	2013	2016	2017	CAGR % 2013- 2017	% Increase 2017/ 2016
1000 Tons	283	327	335	4.3	2.2
Million $	1,846	1,757	1,856	0.1	5.6

Table 3: Rubber End Products Imports
Source: Turk Stat and ITC Trade Statistics



Graphic 2: Rubber End Products Imports
Source: Turk Stat and ITC Trade Statistics

Vehicle tires imports account for 67% on volume and 51% on value basis of the total Turkey's rubber end products ımports.

HS Code	Definition	2016	2017	% Increase
4008	Plate.sheet.strip.rods of vulcanised rubber other than hard rubber	12	12	-2.1
4009	Tubes. pipes & hoses of vulcanised rubber other than hard rubber	13	14	10.0
4010	Conveyor or transmission belts or belting of vulcanised rubber	7	7	5.3
4011	New pneumatic tires. of rubber	222	219	-1.6
4012	Retreaded/used tire;solid tire. interchangeable tire treads& flaps	9	10	11.5
4013	Inner tubes of rubber	6	5	-8.0
4014	Hygienic/pharmaceutical art of vulcanised rubber	1	2	22.9
4015	Articles of apparel clothing accessories of vulcanised rubber	25	28	14.1
4016	Articles of vulcanised rubber o/t hard rubber. nes	33	38	15.5
4017	Hard rubber in all forms. including waste&scrap;articles of hard rubber	0	0	-17.6
	Total	327	335	2.2

Table 4: Rubber End Products Imports by HS Codes. (1000 Ton)
Source: Turk Stat and ITC Trade Statistics

HS Code	Definition	2016	2017	% Increase
4008	Plate.sheet.strip.rods of vulcanised rubber other than hard rubber	**58**	60	2.9
4009	Tubes. pipes & hoses of vulcanised rubber otner than hard rubber	**139**	150	7.6
4010	Conveyor or transmission belts or belting of vulcanised rubber	**97**	106	9.5
4011	New pneumatic tires. of rubber	**917**	937	2.2
4012	Retreaded/used tire;solid tire. interchangeable tire treads& flaps	**40**	44	8.9
4013	Inner tubes of rubber	**18**	16	-11.4
4014	Hygienic/pharmaceutical art of vulcanised rubber	**12**	13	8.4
4015	Articles of apparel clothing accessories of vulcanised rubber	**136**	157	15.1
4016	Articles of vulcanised rubber o/t hard rubber. nes	**338**	373	10.2
4017	Hard rubber in all forms. including waste&scrap;articles of hard rubber	**1**	1	3.0
	Total	**1,757**	**1,856**	5.6

Table 5: Rubber End Products Imports by HS Codes (Million $)
Source: Turk Stat and ITC Trade Statistics

2.2.2. IMPORTS BY COUNTRIES

In 2017. rubber end products were imported from about 100 countries. The share of 10 countries in total product imports was realized as 67% on amount and value basis Germany, Romania, Italy, Malaysia and Slovakia were the top five countries that Turkey imported the most.

Countries	1000 Tons	Million $	Ton-%	$-%
Germany	29	234	9	13
Romania	32	161	9	9
Italy	18	143	6	8
Malaysia	23	124	7	7
Slovakia	26	111	8	6
S.Korea	26	108	8	6
France	11	99	3	5
Poland	22	97	7	5
Spain	16	87	5	5
China	20	77	6	4
10 Countries Total	223	1,240	67	67
Others	111	616	33	33
Total	335	1,856	100	100

Table 6: Main Import Partners for Rubber End Products (2017)
Source: Turk Stat and ITC Trade Statistics

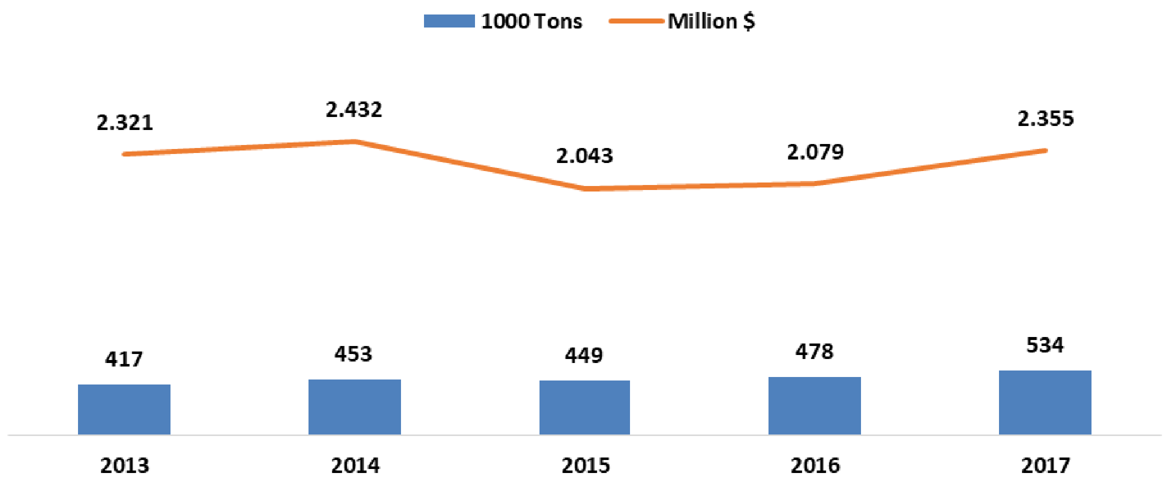
2.2.3. EXPORTS

Rubber end products exports having been 417 thousand tons and 2 billion 321 million dollars in 2013 reached up 534 thousand tons and 2 billion 355 million dollars in 2017 with an annual increase of 6.4% on amount and 0.4% on value basis for the last five years.

Rubber end products exports increased by 11.7% on amount and 13.3% on value basis in 2017 compared to 2016.

	2013	2016	2017	CAGR % 2013- 2017	% Increase 2017/ 2016
1000 Tons	417	478	534	6.4	11.7
Million $	2,321	2,079	2,355	0.4	13.3

Table 7: Rubber End Products Exports
Source: Turk Stat and ITC Trade Statistics



Graphic 3: Rubber End Products Exports
Source: Turk Stat and ITC Trade Statistics

Vehicle tires exports account for 59% on volume and 49% on value basis of the total Turkey's rubber end products exports.

HS Code	Definition	2016	2017	% Increase
4008	Plate.sheet.strip.rods of vulcanised rubber other than hard rubber	13	13	3.4
4009	Tubes. pipes & hoses of vulcanised rubber otner than hard rubber	64	77	21.0
4010	Conveyor or transmission belts or belting of vulcanised rubber	15	18	22.0
4011	New pneumatic tires. of rubber	285	316	10.8
4012	Retreaded/used tire;solid tire. interchangeable tire treads& flaps	6	7	6.8
4013	Inner tubes of rubber	0	0	-23.5
4014	Hygienic/pharmaceutical art of vulcanised rubber	0	0	-28.8
4015	Articles of apparel clothing accessories of vulcanised rubber	1	1	37.2
4016	Articles of vulcanised rubber o/t hard rubber. nes	93	101	8.0

4017	Hard rubber in all forms. including waste&scrap;articles of hard rubber	1	1	5.4
	Total	**478**	**534**	11.7

Table 8: Rubber End Products Exports by HS Codes (1000 Ton)
Source: Turk Stat and ITC Trade Statistics

HS Code	Definition	2016	2017	% Increase
4008	Plate.sheet.strip.rods of vulcanised rubber other than hard rubber	41	43	4.4
4009	Tubes. pipes & hoses of vulcanised rubber otner than hard rubber	345	418	20.9
4010	Conveyor or transmission belts or belting of vulcanised rubber	44	54	22.3
4011	New pneumatic tires. of rubber	991	1,148	15.8
4012	Retreaded/used tire;solid tire. interchangeable tire treads& flaps	6	12	87.0
4013	Inner tubes of rubber	4	3	-24.9
4014	Hygienic/pharmaceutical art of vulcanised rubber	2	2	-16.8
4015	Articles of apparel clothing accessories of vulcanised rubber	5	6	26.8
4016	Articles of vulcanised rubber o/t hard rubber. nes	635	666	4.8
4017	Hard rubber in all forms. including waste&scrap;articles of hard rubber	6	5	-19.7
	Total	**2,079**	**2,355**	13.3

Table 9: Rubber End Products Exports By HS Codes (Million $)
Source: Turk Stat and ITC Trade Statistics

2.2.4. EXPORTS BY COUNTRIES

Rubber end products were exported to more than 150 countries in 2017 and the 10 countries shared 55% on volume and 60% on value basis of total rubber end product exports.

The Turkish rubber industry is exporting rubber products to countries such as Germany, Italy, USA, Netherlands and Poland by converting the raw materials imported to high value of end products.

Countries	1000 Tons	Million $	Ton-%	$-%
Germany	100	506	19	21
Italy	35	164	7	7
USA	29	128	6	5
Netherlands	25	112	5	5
Poland	21	92	4	4
Spain	20	91	4	4
France	18	90	3	4
Bulgaria	13	79	2	3
UK	17	79	3	3
Belgium	15	60	3	3
10 Countries Total	293	1,402	55	60
Others	241	953	45	40
Total	534	2,355	100	100

Table 10: Main Export Partners for Rubber End Products (2017)
Source: Turk Stat and ITC Trade Statistics

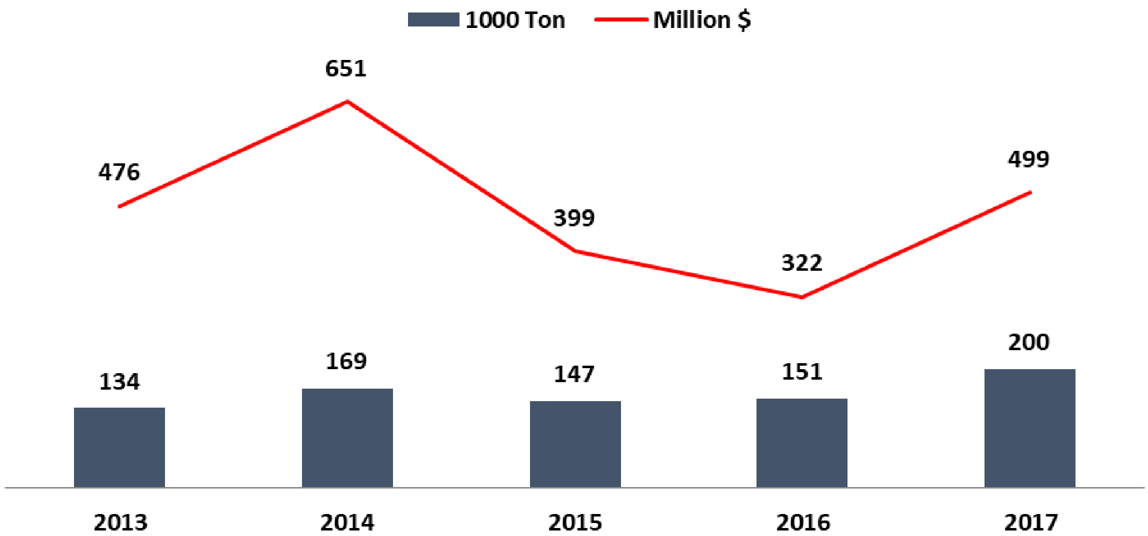
2.2.5. FOREIGN TRADE SURPLUS

Rubber end products foreign trade surplus having been 134 thousand tons and 476 million dollars in 2013 reached up 200 thousand tons and 499 million dollars in 2017 with an annual increase of 10.5% on amount and 1.2% on value basis for the last five years.

Rubber end products foreign trade surplus increased by 32.3% on amount and 54.8% on value basis in 2017 compared to 2016.

	2013	2016	2017	CAGR % 2013- 2017	% Increase 2017/ 2016
1000 Tons	134	151	200	10.5	32.3
Million $	476	322	499	1.2	54.8

Table 11: Foreıgn Trade Surplus for Rubber End Products
Source: Turk Stat and ITC Trade Statistics



Graphic 4: Foreıgn Trade Surplus for Rubber End Products
Source: Turk Stat and ITC Trade Statistics

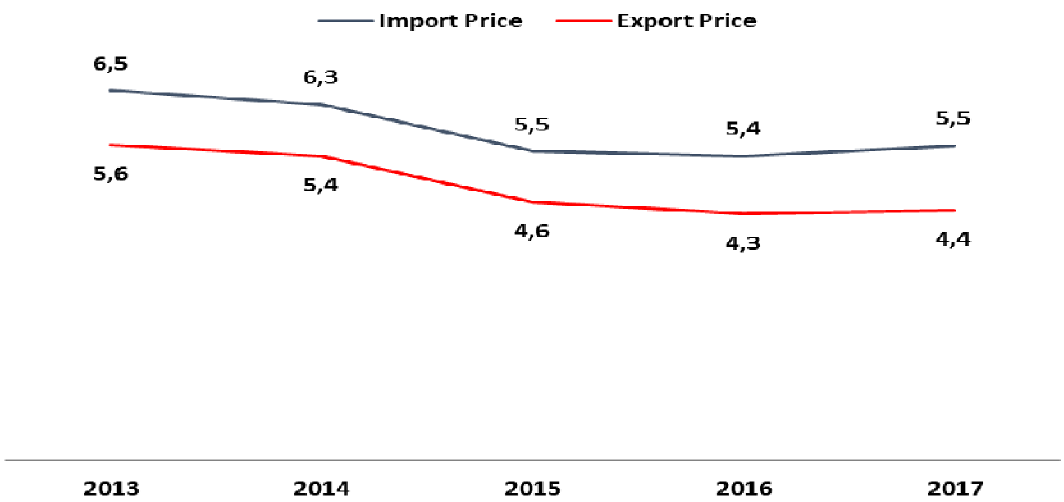
2.2.6. IMPORT AND EXPORT PRICES

Turkey imports rubber end products with higher unit prices and exports them with lower unit prices. In the period of 2013-2017. the average import price of rubber end products declined by an average of 4% a year and the export price by 5.7%.

In 2017, the average import price increased by 3.4% and export price increased by 1.4% compared to 2016.

	2013	2016	2017	CAGR % 2013- 2017	% Increase 2017/ 2016
Import Price	6,5	5,4	5,5	-4.0	3.4
Export Price	5,6	4,3	4,4	-5.7	1.4

Table 12: Import and Export Prices for Rubber End Products
Source: Turk Stat and ITC Trade Statistics



Graphic 5: Import and Export Prices for Rubber End Products
Source: Turk Stat and ITC Trade Statistics

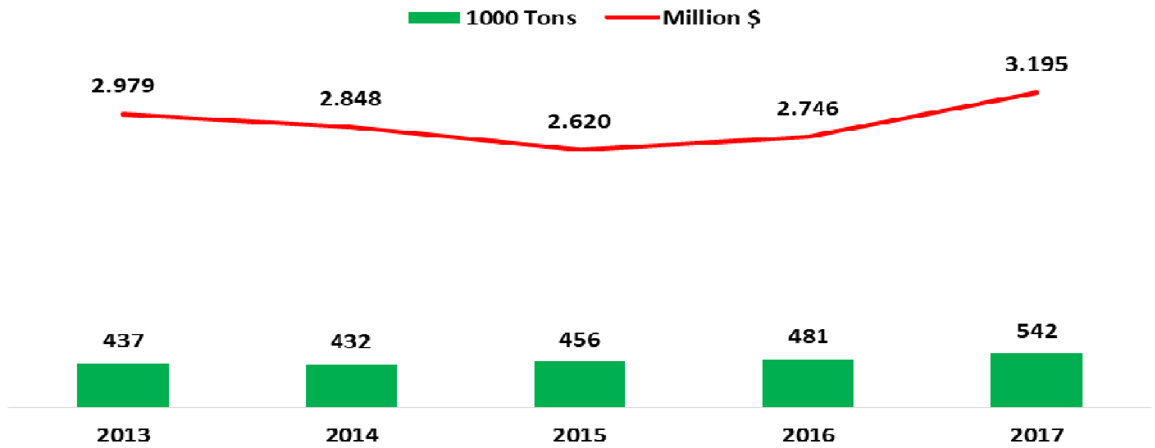
2.3. DOMESTIC CONSUMPTION

Domestic consumption of rubber end products which amounted to 437 thousand tons and 2 billion 959 million dollars in 2013 with an annual increase rate of 5.5% on amount and 1.8% on value basis per year reached to 542 thousand tons and 3 billion 195 million dollars in 2017 respectively.

Domestic consumption of rubber end products increased by 12.8% on amount and 16.4% on value basis compared to 2016.

	2013	2016	2017	CAGR % 2013- 2017	% Increase 2017/ 2016
1000 Tons	437	481	542	5.5	12.8
Million $	2,979	2,746	3,195	1.8	16.4

Table 13: Rubber End Products Domestic Consumption
Source: Turk Stat and ITC Trade Statistics



Graphic 6: Rubber End Products Domestic Consumption
Source: Turk Stat and ITC Trade Statistics

2.4. RUBBER USAGE TRENDS IN TURKEY AUTOMOTIVE INDUSTRY

The automotive sector is one of the leading locomotives largest exporters and largest investor industries of the Turkish economy as well as in developed and developing countries.

Turkey is 7th in EU countries and 17th in the world in the production of passenger cars while ranked as first in Europe and eighth in the world in commercial vehicle production. The production of motor vehicles in Turkey is following a different course every year in parallel with the crisis and experienced economic conjuncture. The average compound annual growth rate (CAGR) of production in the period covering 2013 - 2017 is 15.3% in passenger cars and 3% in commercial vehicle and 10.4% in total vehicles.

In parallel with the changing preferences of the consumers in the Turkish automotive sector firms offer domestic market new and different models of vehicles by producing or importing every year.

In 2017, 1 million 121 thousand of passenger cars and 553 thousand commercial vehicles and as a total of 1 million 674 thousand vehicles have been produced. In comparison with the year 2016 production has increased by 18% in passenger cars 3% in commercial vehicles and 13% in total in 2017

Since 2000, Turkey has chosen a large export-based production model as an automotive industry vehicle and spare parts. Structural change that has been taking place since the beginning of the 2000s in the sector has brought international competition conditions instead of domestic competition in the manufacture of vehicles and subcontracting industries and it is possible to produce vehicles and parts in international standards in the automotive industry.

The automotive industry in the world and in Turkey is faced with new demands which are increasing day by day. In cars drivers want to have;

- ✓ Higher performance
- ✓ Greater reliability and security
- ✓ Higher comfort
- ✓ More fuel economy
- ✓ Better style
- ✓ While lower prices are being sought, social pressures are increasing to protect the environment.

Rubber use in automotive industry increase in parallel to vehicles production and renewal demand.

By 2017, 53.3% of the net weight of a vehicle is made of steels 16.9% is made of metals other than steel. It is seen that the share of plastic in automobile production which was 9.9% in 2010 increased to 12.7% in 2017 and the share of rubber rose from 5.4% to 7.2%.

In parallel to vehicles production and number of vehicles in park the amount of plastic used in the total weight of vehicles increased by 53.3% and 57.7% for rubbers in 2017 compared to 2013. As a result of this increase it is observed that consumption of 328 thousand tons of plastics used reached up to 503 tons in 2017. On the other hand, consumption of rubber in automotive industry increased from 182 thousand tons to 287 thousand tons in 2017.

The amount of automotive plastics used in the automotive industry with 503 thousand tons in 2017 is expected to increase by 16.7% in 2020 and will rise to 587 thousand tons and rubber usage will increase by 18% in 2020.

2.5. VEHICLES TIRES INDUSTRY IN TURKEY

In Turkey, the rubber market is growing every year due to increased number of motor vehicles more than the western countries.

Tire imports which was 17.2 million units in 2013. increased to 20.8 million units in 2017. In 2017, 56% of total tire imports were passenger cars, 16% were buses/trucks, 26% were bicycles and motorcycles and 3% were agricultural and industrial vehicle tires.

	2013	2016	2017	% Import Share
Passenger Cars	**9,120**	**11,126**	11,569	56
Bus - Truck	**2,917**	**3,227**	3,284	16
Airplane	**3**	**15**	8	0
Bicycles and motorcycles	**4,736**	**6,167**	5,432	26
Agriculture and Industrial	**402**	**389**	537	3

Total	**17,177**	**20,924**	20,830	100

Table 14: Vehicles Tire Imports (1000 Units)
Source: Turk Stat and ITC Trade Statistics

Rubber tire export has an increasing trend. Rubber tire exports which was 15.2 million units in 2013 reached up to 21.2 million units in 2017.

	2013	2016	2017	% Export Share
Passenger Cars	**9,317**	**11,073**	13,740	64.9
Bus - Truck	**4,597**	**6,056**	5,920	28.0
Airplane	**1**	**0**	0	0.0
Bicycles and motorcycles	**201**	**262**	238	1.1
Agriculture and Industrial	**1,098**	**963**	1,258	5.9
Total	**15,214**	**18,355**	21,157	100.0

Table 15: Vehicles Tires Exports (1000 Units)
Source: Turk Stat and ITC Trade Statistics

Foreign trade surplus realized as 327 thousand units in 2017.

	2013	2016	2017
Passenger Cars	197	-53	2,171
Bus - Truck	1,680	2,829	2,636
Airplane	-2	-14	-8
Bicycles and motorcycles	-4,535	-5,905	-5,194
Agriculture and Industrial	696	574	721
Total	-1,964	-2,569	327

Table 16: Vehicles Tire Foreign Trade Equilibrium (1000 Units)
Source: Turk Stat and ITC Trade Statistics

In the Turkish automotive tires market nearly 100 domestic and foreign brands compete 60% domestic production tires are preferred in the refurbishment market. The annual capacity of the producers in Turkey is about 30 million. This figure is expected to rise to 40 million in 5 years with new investments.

In Turkey an average of 30 million passenger cars tires are produced annually and 21 million are exported. On the other hand, 21 million units of total 30 million of domestic consumption are covered by imports.

About 71% of tire production are exported while 70% of domestic consumption are covered by imports in 2017.

In the vehicles tire production, Turkey has become an important production center of world brands such as Brisa, Goodyear, Pirelli, Petlas and Fulda with factories. The tire market leader in Turkey is Brisa the owner of Lassa and Bridgestone brands. Michelin is following Brisa and Goodyear, Pirelli, Petlas have a significant share of the market.

	2013	2016	2017
Production	30,000	30,000	30,000
Imports	17,177	20,924	20,830
Exports	15,214	18,355	21,157
Domestic Sales	31,965	32,573	29,678
Exports/Production	51	61	71
Imports/Domestic Sales	54	64	70
Exports/Imports	89	88	102

Table 17: Supply and Demand for Vehicles Tire Industry (1000 Units)
Source: Turk Stat and ITC Trade Statistics

The most important inputs of the vehicles tire (tire wheel) sector are natural and synthetic rubber and carbon. However, Turkey has 100% import dependency. especially in natural rubber.

It is expected that the tire industry in Turkey will show a significant increase in the coming periods. When examined in terms of the number of cars per person. Turkey has a very below the European countries. indicating that this is an important potential in Turkey.

The competitiveness of the tire sector is also diminishing due to the tires imported from Far East countries at very low prices in the domestic market.

2.6. SUPPLY AND DEMAND

In rubber end products industry production in the last 5 years has increased by 6.7% on average per year while production value has increased by 1.7%. In the mentioned period, the annual rate of increase in imports was realized as 4.3% on amount and 0.1% on the value basis while the rate of decrease in exports was 6.4% on amount and 0.4% on the value basis. The increase in production during the period of 2012 - 2016 is due to the increase in domestic consumption. As a matter of fact, domestic consumption in this period has increased by 5.5% on amount and 1.8% on value basis on average.

While the industry giving 200 thousand tons and 499 million dollars of foreign trade surplus. 72% on amount and 64% on value basis of total production was exported and 62% on amount and 58% on value basis of domestic consumption was covered by imports.

	2013	2016	2017	CAGR % 2013- 2017	% Increase 2017/ 2016
Production	572	632	742	6.7	17.5
Imports	283	327	335	4.3	2.2

Exports	417	478	534	6.4	11.7
Domestic Consumption	437	481	542	5.5	12.8
Foreign Trade Surplus	134	151	200	10.5	32.3
Exports/Production (%)	73	76	72		
Imports/Domestic Consumption (%)	65	68	62		
Exports/Imports (%)	147	146	160		

Table 18: Supply and Demand for Rubber End Products (1000 Ton)
Source: Turk Stat and ITC Trade Statistics

	2013	2016	2017	CAGR % 2013- 2017	% Increase 2017/ 2016
Production	3,455	3,068	3,694	1.7	20.4
Imports	1,846	1,757	1,856	0.1	5.6
Exports	2,321	2,079	2,355	0.4	13.3
Domestic Consumption	2,979	2,746	3,195	1.8	16.4
Foreign Trade Surplus	476	322	499	1.2	54.8
Exports/Production (%)	67	68	64		
Imports/Domestic Consumption (%)	62	64	58		
Exports/Imports (%)	126	118	127		

Table 19: Supply and Demand for Rubber End Products (Million $)
Source: Turk Stat and ITC Trade Statistics

3. RUBBER RAW MATERIALS INDUSTRY

3.1. PRODUCTION

The rubber industry in Turkey is entirely dependent on imports for raw materials. The propylene and ethylene used in the production of EPDM are produced by PETKİM and the aromatic oil used in the production of SBR (SBR 1712) is supplied by TÜPRAŞ.

On the other hand, according to TOBB Industry Database. it is seen that 2 firms in Turkey produce synthetic rubber, 107 firms produce rubber based solutions and 5 firms produce rubber additives.

3.2. FOREIGN TRADE

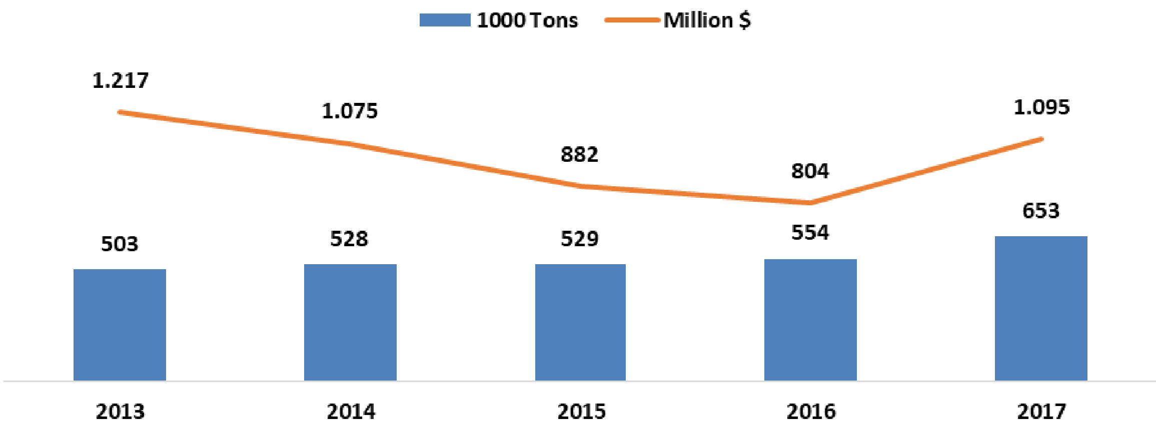
3.2.1. IMPORTS

Rubber raw materials imports having been 503 thousand tons and 1 billion 217 million dollars in 2013 reached up 653 thousand tons and 1 billion 95 million dollars in 2017 with an annual increase of 6.8% on amount and decrease of 2.6% on value basis for the last five years.

Rubber raw materials imports increased by 17.9% on amount and by 36.3% on value basis in 2017 compared to 2016.

	2013	2016	2017	CAGR % 2013- 2017	% Increase 2017/ 2016
1000 Tons	503	554	653	6.8	17.9
Million $	1,217	804	1,095	-2.6	36.3

Table 20: Rubber Raw Materials Imports
Source: Turk Stat and ITC Trade Statistics



Graphic 7: Rubber Raw Materials Imports
Source: Turk Stat and ITC Trade Statistics

3.2.2. IMPORTS BY COUNTRIES

Turkey imported rubber raw materials from about 60 countries in 2017 and 71% of total imports on amount and 73% on value basis were realized from 10 countries. In 2017 Indonesia, Thailand and S. Korea are the first three import partners.

Countries	1000 Tons	Million $	Ton-%	$-%
Indonesia	87	163	13	15
Thailand	54	105	8	10
S.Korea	48	99	7	9
Russian Fed.	39	76	6	7
Taiwan	34	70	5	6
Germany	34	66	5	6
USA	36	62	5	6
Netherlands	49	56	8	5
Italy	66	56	10	5
Japan	18	48	3	4
10 Countries Total	465	801	71	73
Others	188	294	29	27
Total	653	1,095	100	100

Table 21: Main Import Partners of Turkey for Rubber Raw Materials (2017)
Source: Turk Stat and ITC Trade Statistics

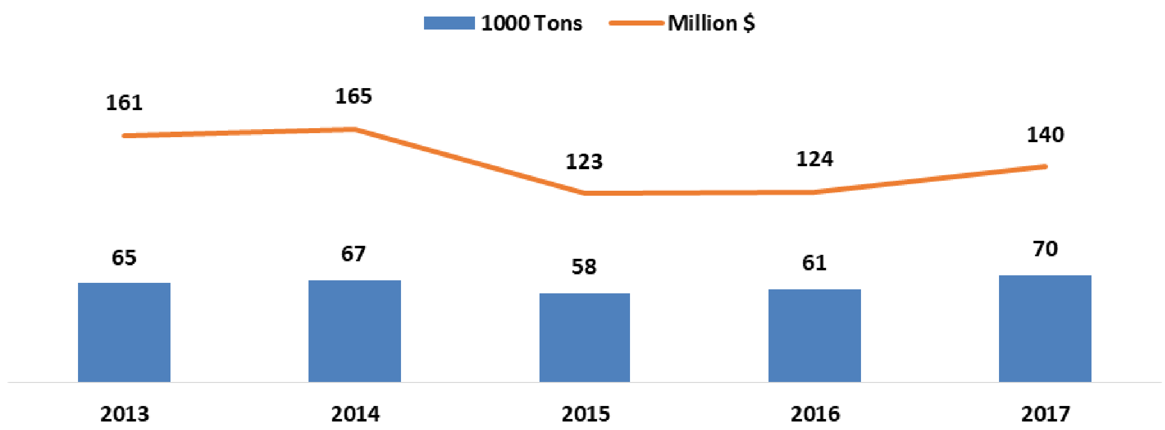
3.2.3. EXPORTS

Rubber raw materials exports having been 65 thousand tons and 165 million dollars in 2013 reached up 70 thousand tons and 140 million dollars in 2017 with an annual increase of 2.1% on amount and decrease of 3.3% on value basis for the last five years.

Rubber raw materials exports increased by 14.9% on amount and by 13.1% on value basis in 2017 compared to 2016.

	2013	2016	2017	CAGR % 2013- 2017	% Increase 2017/ 2016
1000 Tons	65	61	70	2.1	14.9
Million $	161	124	140	-3.3	13.1

Table 22: Rubber Raw Materials Exports
Source: Turk Stat and ITC Trade Statistics



Graphic 8: Rubber Raw Materials Exports
Source: Turk Stat and ITC Trade Statistics

3.2.4. EXPORTS BY COUNTRIES

In 2017, Turkey exported rubber raw materials to more than 110 countries. The top 10 exporting countries had the largest share of total exports of 51% on amount and 57% on value basis. In this period Romania, Germany and Poland formed the first three countries to which Turkey exported rubber raw materials the most.

Countries	1000 Tons	Million $	Ton-%	$-%
Romania	7	16	10	12
Germany	5	12	7	9
Poland	5	10	7	7
Italy	4	10	6	7
Bulgaria	2	6	3	5

Chez Rep.	2	6	3	4
USA	2	6	3	4
Iran	3	5	4	4
Russian Fed.	2	5	3	4
China	3	5	4	3
10 Countries Total	36	80	51	57
Others	34	60	49	43
Total	70	140	100	100

Table 23: Main Export Partners for Rubber Raw Materials (2017)
Source: Turk Stat and ITC Trade Statistics

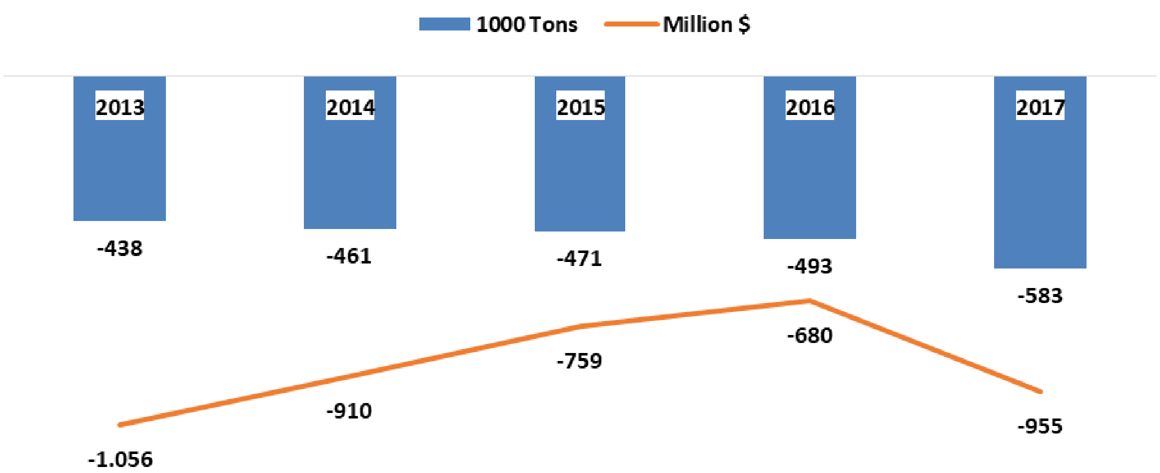
3.2.5. FOREIGN TRADE DEFICIT

Rubber raw materials foreign trade deficit. which was 438 thousand tons and 1 billion 56 million dollars in 2013 realized as 583 thousand tons and 955 million dollars in 2017 with an increase of 7.4% on amount and 2.5% on value basis.

Foreign trade deficit in rubber raw materials in 2017 increased 18.3% on amount and 40.5% on value basis compared to 2016.

	2013	2016	2017	CAGR % 2013- 2017	% Increase 2017/ 2016
1000 Tons	-438	-493	-583	7.4	18.3
Million $	-1,056	-680	-955	-2.5	40.5

Table 24: Rubber Raw Materials Foreign Trade
Source: Turk Stat and ITC Trade Statistics



Graphic 9: Rubber Raw Materials Foreign Trade
Source: Turk Stat and ITC Trade Statistics

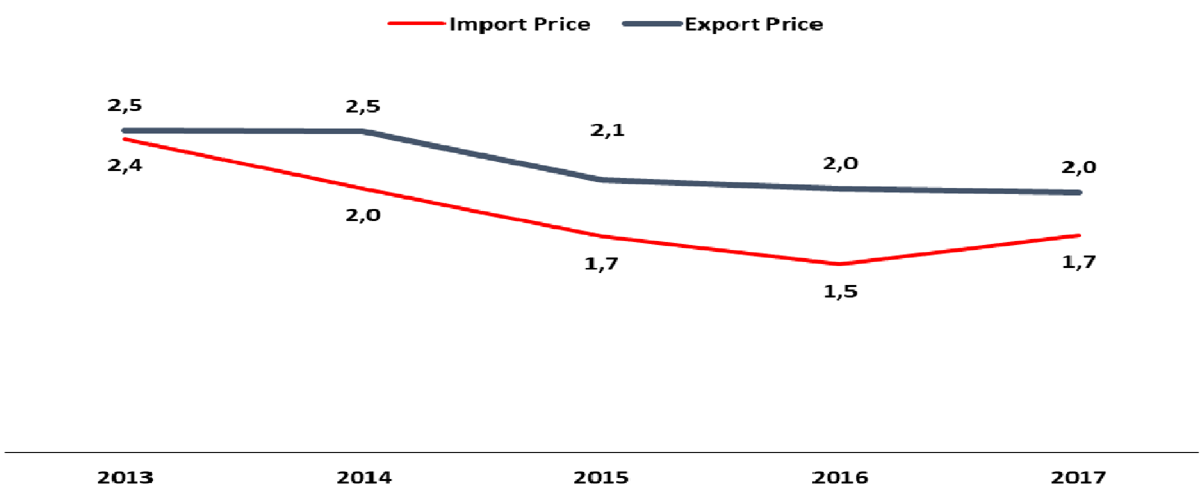
3.2.6. FOREIGN TRADE PRICES

Between 2013 and 2017 rubber raw material import prices decreased by 8.8% on average and export prices by 5.3%.

In 2017 rubber raw material import price was 15% lower than export price.

	2013	2016	2017	CAGR % 2013- 2017	% Increase 2017/ 2016
Import Price	2,4	1,5	1,7	-8.8	15.5
Export Price	2,5	2,0	2,0	-5.3	-1.6

Table 25: Rubber Raw Materials Average Foreign Trade Prices ($/kg)
Source: Turk Stat and ITC Trade Statistics



Graphic 10: Rubber Raw Materials Average Foreign Trade Prices ($/kg)
Source: Turk Stat and ITC Trade Statistics

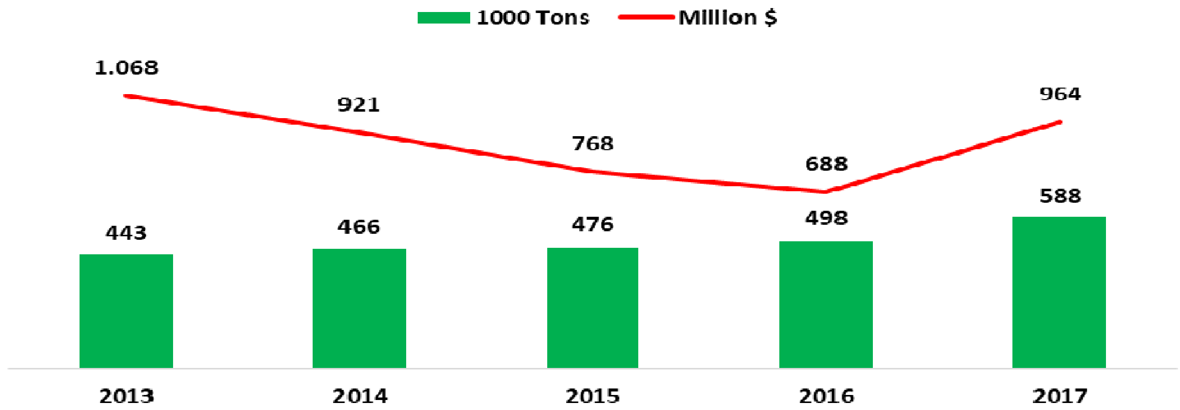
3.3. DOMESTIC CONSUMPTION

Domestic market consumption of rubber raw materials which was 443 thousand tons and 1 billion 68 million dollars in 2013 annually increased by 7.3% and decreased by 2.5% on value basis on average reached to 588 thousand tons and 964 million dollars in 2017 respectively.

Domestic consumption of rubber raw materials increased by 18.1% on amount and 40% on value basis in 2017 compared to 2016.

	2013	2016	2017	CAGR % 2013- 2017	% Increase 2017/ 2016
1000 Tons	443	498	588	7.3	18.1
Million $	1,068	688	964	-2.5	40.0

Table 26: Rubber Raw Materials Domestic Consumption
Source: Turk Stat and ITC Trade Statistics



Graphic 11: Rubber Raw Materials Domestic Consumption
Source: Turk Stat and ITC Trade Statistics

3.4. SUPPLY AND DEMAND

In rubber raw materials industry during the 2013 – 2017 period production stayed at the same levels on amount and decreased by 6.98% on value basis while imports increased by 6.8% on amount and decreased by 2.6% on value basis exports increased by 2.1% on amount and decreased by 3.3% on value basis. On the other hand, domestic consumption increased by 7.3% on amount and decreased by 2.5% on value basis.

In rubber raw materials industry, imports increased by 17.9%. exports 14.9% domestic consumption by 18.1 and foreign trade surplus by 18.3 in 2017 compared to 2016.

	2013	2016	2017	*CAGR % 2013- 2017*	*% Increase 2017/ 2016*
Production	5	5	5	0.0	0.0
Imports	503	554	653	6.8	17.9
Exports	65	61	70	2.1	14.9
Domestic Consumption	443	498	588	7.3	18.1
Foreign Trade Surplus	-438	-493	-583	7.4	18.3

Table 27: Supply and Demand in Rubber Raw Materials (1000 Ton)
Source: Turk Stat and ITC Trade Statistics

	2013	2016	2017	*CAGR % 2013- 2017*	*% Increase 2017/ 2016*
Production	12	9	9	-6.9	5.5
Imports	1,217	804	1,095	-2.6	36.3
Exports	161	124	140	-3.3	13.1
Domestic Consumption	1,068	688	964	-2.5	40.0
Foreign Trade Surplus	-1,056	-680	-955	-2.5	40.5

Table 28: Supply and Demand in Rubber Raw Materials (Million $)
Source: Turk Stat and ITC Trade Statistics

4. MAIN PROBLEMS AND SOLUTIONS PROPOSALS

The most important problems of the rubber industry is the import dependency of raw materials. Over 90% import dependency of raw materials variable prices for raw materials, unbalanced raw material supply, uncontrolled scrap market and high transportation and energy costs constitute the major negatives in this issue.

- ✓ Another important problem of the industry is the inadequacy of trained staff in the processing technology.
- ✓ The lack of common activity culture in the industry is another problem encountered in lack of joint venture.
- ✓ Lack of use of high performance and value added rubber raw materials dependency on foreign machine technology only user-level stay in technology lack of information about product development processes and incompleteness of laboratory, R&D and technological problems.

To solve the problems of the rubber industry and to increase the production and export competitiveness of the industry;

- ✓ Restarting of SDR production in Turkey.
- ✓ Domestic production of Carbon in Turkey.
- ✓ Recruitment of bulk purchasers with raw material procurement at more competitive prices. Supporting the regional clustering of manufacturers.
- ✓ The production of end products that gain more added value through activities such as innovation. clustering and technology.
- ✓ Implementation of waste management and application.
- ✓ The creation of value-added innovative and high-tech products. the emergence of technologically "watching" position from "watching" technology.
- ✓ Production of high-tech products in high technology sectors such as defense industry, Automotive, aviation.
- ✓ Encouraging companies to invest in R&D activities is among the objectives of the industry.

5. PAGEV PROJECTS

PAGEV which is the “Unifying Power “of the Turkish plastics industry develops different projects aiming to solve the problems outlined above. These are in summary: "Plastic Center of Excellence" and "International Regional Plastics Production Center".

5.1. PAGEV PLASTICS CENTER OF EXCELLENCE

Plastic materials used in all areas of life are rapidly taking place of other alternative products because of their superior properties in Turkey as well as in all over the world. Plastics which usage in all sectors increasing is becoming an indispensable material for the 21st century.

Turkish Plastics Industry which is one of the fastest growing sectors in our country despite being young is the 6th in the world and the 2nd in Europe. Growing with the goal of leadership in Europe, the Turkish Plastics Sector aims to increase the certification and added value of its products.

PAGEV, "Unifying Power" of the Turkish Plastics industry is leading the industry with the "PAGEV Plastic Excellence Center" for realizing this purpose. The mission of the PAGEV Center for Plastic Excellence will include the following activities.

- ✓ Research and Development
- ✓ Test and Laboratory Services
- ✓ Certification
- ✓ Training
- ✓ Competent Consulting

With the Center of Excellence, the test and laboratory support that the plastic industry needs; will be provided to the industry. So many problems that lead to loss of time and energy such as high test costs, overseas shipping, customs clearance and long test times will be removed.

The platforms that will provide information to and knowledge sharing in the industry will be developed by the Center and detailed training programs will be prepared and presented for the benefit of the industry. While working on the newest technologies, the Center of Excellence will work together with industry organizations, universities, research institutes, professional associations and non-governmental organizations to work for the Turkish plastics industry to be the world leader with R&D and innovation based work.

Established with the support of the Ministry of Science. Industry and Technology. PAGEV Plastic Center of Excellence will provide to the plastics industry and Turkish economy. especially the development of industrial skills and capabilities that will form the basis of Turkey's national projects.

By PAGEV Plastic Center of Excellence, which will be established by strategic cooperation. It is aimed to grow the plastic industry faster with its traceable targets, scientific quality and high potential for commercialization.

Upon completion the Center of Excellence which will have an area of over 30 thousand m^2 rises right beside PAGEV Vocational and Technical Anatolian High School in Küçükçekmece, Istanbul. PAGEV Plastic Center of Excellence, which will make Turkey the center of plastic production in the world will carry out innovative projects.

In addition to this. the Center will create a control mechanism for the products exported abroad. The Center will also contribute to the preservation of the reliability and reputation of the plastic products produced in Turkey. On the other hand, the introduction of poor quality and non-standard goods into the country will be prevented by determining the technical suitability of the plastic products imported from abroad without any definite importation in the laboratories.

With its superior information infrastructure, the Center of Excellence will present the important documents required by the players of the sector more economically and quickly.

By accelerating the development we will focus on the development of products and production technologies that will increase the competitive power of our firms.

The Center of Excellence which will develop innovative ideas by following the developments in the world plastic sector will increase the competitive power of our firms by providing many field consultancy services from the determination of appropriate input materials to the optimization of production process.

5.2. INTERNATIONAL REGIONAL PLASTIC MANUFACTURING CENTER

Although the Turkish plastics sector with its process capacity reaching 9 million tons has the 6th largest plastics production capacity in the world and 2nd in Europe imports more than 85% of the plastic raw material it needs.

One of the most important advantages of the plastics industry in Turkey is that it is located between the Middle East countries which are the main petroleum and plastic raw material producer and the European market which is the main plastic consumer.

PAGEV aims to unify the plastic raw materials potential of Middle East countries with the Turkish plastics industry's competent production capability and experience at the international regional plastic production center which Turkey aims to establish in South East Anatolia Region.

In the center to be established with the win - win principle. the plastics raw materials producer countries will be supplying cheap and reliable raw materials having a large volume and reliable market while Turkish plastics industry will have greater competition possibilities in the global markets with its growing production capacity and falling costs.