



PAGEV



**TURKISH PLASTICS PACKAGING
MATERIALS INDUSTRY
FOLLOW-UP REPORT
2017**

www.pagev.org



— FOREWORD —

The plastics industry is one of the key drivers of the Turkish economy. With over 10 million tons of production, 40 billion dollars in revenue, 5 billion dollars in direct exports and an annual rate of growth that has consistently exceeded 10% over the last decade, the industry is increasingly a major contributor to the economy. The industry has the second highest production capacity in Europe, and sixth in the world. Staying true to our mission of being the "uniting force" of the Turkish plastics industry, we at PAGEV continue to implement projects that will carry our industry forward.

We rely on scientific, proven data showing how plastics constitute an indispensable part of our lives to solve long-standing issues in the industry in a meaningful way, and we realize that having accurate and reliable information is the largest part of the solution. We keep up the research, collect and compile new data, and publish them in reports. We make our reports and position papers containing valuable information available to all plastics industry representatives and stakeholders, and to public institutions.

We developed a set of reports through long and thorough research, which we hope will contribute significantly to our industry. Expert researchers used accurate and reliable data to determine the current position of the Turkish plastics industry, the problems we all face, and what tangible steps we need to take in order to overcome these issues. We believe that the set of reports and position papers we make available to PAGEV members and all stakeholders will help to shape the world of plastics. It delights us further that our work will enable public authorities to access the most current and accurate data regarding the plastics industry.

By offering these reports in English, we hope that our members will be able to share the true potential of the plastics industry in Turkey with their business partners abroad.

It is our pleasure to present you a compendium of current reports and supplemental information, and I would like to take this opportunity to extend my gratitude to everyone who has helped our industry grow into the driving force that it is today.

Yours sincerely,

Yavuz EROĐLU
PAGEV Chairman

CONTENTS

EXECUTIVE SUMMARY

1. THE FUNCTIONS OF PACKAGING	01
2. TYPES OF PACKAGING	01-03
2.1. WOOD PACKAGING	01
2.2. GLASS PACKAGING	01
2.3. PAPER AND PAPERBOARD PACKAGING	02
2.4. COMPOSITE PACKAGING	02
2.5. METAL PACKAGING	02
2.6. PLASTICS PACKAGING	02
2.6.1. PET (POLYETHYLENE TEREPHTHALATE) PACKAGING	02
2.6.2. PVC (POLYVINYL CHLORIDE) PACKAGING	02
2.6.3. PP (POLYPROPYLENE) PACKAGING	03
2.6.4. PS (POLYSTIREN) PACKAGING	03
2.6.5. PE (POLY ETHYLENE) PACKAGING	03
2.6.5.1. HDPE (HIGH DENSITY POLYETHYLENE) PACKAGING	03
2.6.5.2. LPDE (LOW DENSITY POLYETHYLENE) PACKAGING	03
2.6.6. PC (POLYCARBONATE) PACKAGING	03
3. TURKISH PLASTICS PACKAGING INDUSTRY	04-12
3.1. PRODUCTION CAPACITY	04
3.2. PRODUCTION	05-06
3.3. FOREIGN TRADE	06-14
3.3.1. IMPORTS	07-08
3.3.2. IMPORTS BY COUNTRIES	09
3.3.3. EXPORTS	09-11
3.3.4. EXPORTS BY COUNTRIES	11
3.3.5. FOREIGN TRADE SURPLUS	12
3.3.6. IMPORTS AND EXPORT PRICES	13
3.3.7. VALUE ADDED CREATED IN PLASTIZ PACKAGING EXPORTS	14
4. DOMESTIC CONSUMPTION	14
5. SUPPLY AND DEMAND AND 2018 ESTIMATES	15-16
6. CONCLUSION	16-17
7. PAGEV PROJECTS	17-18

– EXECUTIVE SUMMARY –

Production of plastic packaging products share between 40-53% in total plastics products manufacturing of leading countries. This ratio is about 40% in Turkey, while the world average is 46% respectively. More than 1/3 of all products in developed countries is packaged with a plastic materials so that after the paper and cardboard is having the biggest market share. In terms of volume, 55% of the packaging is flexible and 45% is rigid. However, this position is reversed in terms of value. Annual consumption value of rigid packaging is 30 billion euros in the European while flexible packaging shares the value of around 10 billion euros.

Plastic packaging products at the end of 2017 compared to 2016 on amount basis; It is estimated that production will increase by 6.3%, imports by 5%, exports by 2.6%, domestic consumption by 7.1% and foreign trade surplus by 0.2%. 23% of total production will be exported, 14% of the domestic consumption will be met by imports and the export coverage ratio of imports is expected to be as 196%.

Annual average increases in plastic packaging materials over the last 5 years covering 2013-2017 on amount basis; 3.4% in production, 5.1% in exports, 9.1% in exports, 2.3% in domestic consumption and 14.3% in foreign trade surplus have been realized. In 2017, 24% of total production was exported, 14% of domestic consumption was met by imports, and the import coverage ratio of exports was 196%.

Annual average increases in plastic packaging materials over the last 5 years covering 2013-2017 on value basis; 2.4% in imports, 2.7% in exports, 2.3% in domestic consumption and 3.9% in foreign trade surplus have been realized.

On the other hand, production in this period declined by 0.7% on average and domestic consumption declined by 0.8%. In 2017, 19% of total production was exported, 16% of domestic consumption was covered by imports, and the import coverage ratio of exports was 126%.

1. THE FUNCTIONS OF PACKAGING

The packaging materials which wrapping, storing, carrying and selling by reliable and in a most hygienic way, are defined as the elements that increase the added value of products. From this point of view, the development and increasing per capita consumption of packaging industry in general and the sophistication of packaging consumption is one of the most important indicators of the development of the country.

The functions of the packaging are outlined as follows;

- Protection function
- Carrying function
- Providing information function
- Advertising to function
- Storage function
- Ease of usage function
- Quantity function
- Sales increase function

2. TYPES OF PACKAGING

The packaging types can be divided into 6 section according to the materials used in manufacturing;

- I. Wood Packaging**
- II. Glass Packaging**
- III. Paper and Paperboard Packaging**
- IV. Composite Packaging**
- V. Metal Packaging**
- VI. Plastic Packaging**

- Pet (Polyethylene Terephthalate)
- PVC (Polyvinyl Chloride)
- PP (Polyspropylene)
- PSI (Polystyrene)
- PE (Polyethylene)
- HDPE (High density Polyethylene)
- LDPE (Low Density Polyethylene)
- PC (Polycarbonate)

2.1. WOOD PACKAGING

The wooden packing packaging materials as the world's oldest packaging are widely used in the packaging of fresh fruits and vegetables due to the hardness, durability heavy burden of fragile and the ventilation features. Today, the wood is no longer used as a packing small production units in a simple manner.

2.2. GLASS PACKAGING

Glass packages have structure of bright, smooth and easy to clean. Therefore it does not contain germs. They are economical packaging materials since can be used repeatedly. The glass packaging materials are preferred by the food, drugs and perfumery manufacturers due to the no chemicals reaction, high barrier properties and ease of sterilization. The disadvantages of glass packaging are weight problems and fragility.

2. TYPES OF PACKAGING

2.3. PAPER AND PAPERBOARD PACKAGING

Paper and paperboard materials are highly preferred in packaging due to the ease and economics of manufacturing. This kind of packaging materials are subjected to various treatments because of stiffness, explosion protection, humidity and not enough water barrier characteristics.

2.4. COMPOSITE PACKAGING

Composite packaging materials are obtained by combining the full surface of at least two different materials. The main reason to use of different materials is to increase the durability and flexibility by combining the unique properties of the materials. For example: plastic-aluminum composites, cardboard-polyethylene composites, paper-polyethylene composites, paper-plastic-aluminum composites, paper-aluminum composites. These packages are usually used in our homes for ready soup, fruit juices. They are cheaper and lighter and also have variety of manufacturing covers.

2.5. METAL PACKAGING

Metals are used for the packaging of paint and chemicals. The various organic coatings are developed for the deterioration materials inside. The cans manufactured by aluminum and steel metal are used in the packaging of gas and non-carbonated beverages. Metal packaging creates a strong barrier against light, air and water and they are sufficiently strong and resistant for insects and rodents. Although the use of metal is increasing in beverage and food packaging, it began its place to plastics in the household and automotive industry.

2.6. PLASTICS PACKAGING

Plastic packaging materials are usually obtained by processing the petrochemical plants of various products from oil refineries. Plastics are preferred in packaging materials production since more packages can be produced with lower plastics and its easy shaping characteristics.

Plastic packaging is not only practical and safe, but at the same time it is much more efficient. The exact amount of improvement in the past is stated in a study conducted by GVM (a German market research institute on packaging), comparing the packaging produced in 2013 with the packaging produced in 1991. The striking result of the work is that in Germany, only 2.76 million tons of plastic is consumed instead of 3.7 million tons for packaging, which almost equates to a million tonnes of savings. This material savings has been achieved despite tighter legal requirements for innovative packaging solutions, trade and consumers 'increased demands for food products' fragmentability and durability.

Approximately 63% of all consumer goods in the EU are sold in plastic packaging. By contrast, plastic packaging accounts for only 24% of the total package weight. This clearly demonstrates the high material yield of the plastic as a packaging tool.

2.6.1. PET (POLYETHYLENE TEREPHTHALATE) PACKAGING

It is a thermoplastic material of polyester family. It is available in amorphous (transparent) and semi-crystalline (opaque and white) materials, depending on the heat treatment. The most important advantage is that it can be completely recycled. It can be semi-rigid and rigid depending on thickness. It's too light. It is used as a good gas and humidity bar. It is rigid and resistant to impact. It is naturally colorless and transparent. When produced as a thin film, PET is often coated with aluminum; reflective and opaque. PET bottles are excellent barrier material and have a very wide area especially for soft drinks. In various sizes, drinking water, carbonated beverages, fruit juice and vegetable oil bottles, peanut oil jar, microwave food tray cover, salad containers are the main areas used.

2. TYPES OF PACKAGING

2.6.2. PVC (POLYVINYL CHLORIDE) PACKAGING

There are two types of rigid and flexible PVC materials. Pipes and window frames vegetable oils and shampoo bottles, bleach and transparent liquid detergent containers, liquid motor oil bottles, artificial leas, window cleaning products, fresh meat containers, ketchup bottles, soft toys, electrical insulation, roofing materials are made of PVC.

2.6.3. PP (POLYPROPYLENE) PACKAGING

Chemical substances are resistant to heat and extreme fatigue. They are plastic with moderate hardness and brilliance. Margarine tubes, ketchup bottles, sticks, caps, chips and biscuits, microwave food trays, medicinal bottles, yogurt containers, chairs, suitcases, carpets, ropes and some containers and covers are made of polypropylene plastic. It is the lowest density plastic used in packaging.

2.6.4. PS (POLYSTIREN) PACKAGING

It can be rigid and foam, it is a versatile and purpose-built plastic. It is a very hard, brittle and shiny plastic. It is a very inexpensive resin with a relatively low melting point. Protective packaging is made from polystyrene plastic, examples are; egg cartons, coolers, trays, fast food packaging containers, coffee containers, yogurt containers, video and audio cassette containers, cutlery, cups, caps, small boots and dog containers.

2.6.5. PE (POLYETHYLENE) PACKAGING

It's a kind of plastic we use the most in our homes. There are many uses such as bleach, detergent and shampoo bottles, motor oil bottles, garbage bags. Detergent bottles, trash cans and similar products are made from recycled PE.

2.6.5.1. HDPE (HIGH DENSITY POLYETHYLENE) PACKAGING

It is a very solid and economical material. Naturally, the milk is in the color look. For this reason, it is not used in products where clarity is important. It is one of the most used plastics. It has a wide range of usage due to its low cost, easy formability and resistance to breakage. Milk, water, fruit juices, liquid detergents, engine oils, laundry waters, shampoos, perfume and lotion containers are made of HDPE, such as plastic tubes, waste bags, casings, cable insulations, buckets, thin carrier bags.

2.6.5.2. LDPE (LOW DENSITY POLYETHYLENE) PACKAGING

It is semi-transparent or color. Medium hard and durable plastic. It is a flexible, soft, easily cuttable and wrinkle-resistant plastic. Because LDPE plastics are smooth, flexible and relatively transparent, they are mostly used as film raw materials. LDPE plastics are milk-white if pigment is not added. It is also used in the construction of flexible closures of various jars such as sacks, shirring and stretching shirts, film bags, garbage bags, bread and sandwich bags, various food bags, food boxes, deep freezing bags, cheap kitchenware, grocery bags, margarine tubes and various jars are the most idly uses.

2.6.6. PC (POLYCARBONATE) PACKAGING

Processing, molding and thermoforming of this kinds are easy. Such plastics are plastics which are widely used in the modern manufacturing sector. Polycarbonate is a very durable material, used in making bullet-proof glass. In addition, this polymer is very transparent and light-transmitting structure. It has a better light transmission characteristic than most glass types. The bottles that we use at home are also produced from polycarbonate materials. It is the best feature of this material that it is resistant to bumps.

3. TURKISH PLASTIC PACKAGING PRODUCTS INDUSTRY

Plastic packaging is not only practical and safe, but also much more efficient. The exact amount of improvement in the past is stated in a study conducted by GVM (a German market research institute on packaging), comparing the packaging produced in 2013 with the packaging produced in 1991. The striking result of the work is that in Germany, only 2.76 million tons of plastic is consumed for packaging instead of 3.7 million tons, which equates to a million tons savings. This material savings has been achieved despite tighter legal requirements for innovative packaging solutions, trade and consumers' increased demands for food products' fragmentability and durability.

Approximately 63% of all consumer goods in the EU are transported in plastic bags. By contrast, plastic packaging accounts for only 24% of the total package weight. This clearly demonstrates the high material yield of the plastic as a packaging tool.

3.1. PRODUCTION CAPACITY

In plastic packaging industry, lots of companies manufacture lots of different products, and manufacturing capacities of companies in terms of products cannot be defined over a certain unit. According to the TOBB database, total manufacturing capacity of 1854 registered companies is defined as: (1.188.208 tons + 2.626.400.207 m² + 421.630.400 meters + 4.497.991 pieces)

Turkish plastic packaging industry is made up of flexible plastic by 67%, textile plastics by 18%, and hard plastic packaging products by 15%.

Products	No of Companies	Ton	m ²	Meter	1000 Unit
Plastic Film	205	200,639	1,036,345,507	421,630,400	
Sheets	137	128,243	342,572,240		
Bottles and cans	235	86,589			2,008,991
Storage Containers	543	279,737			1,648,000
Packings Bags	734	493,000	1,247,482,460		841,000
TOTAL	1,854	1,188,208	2,626,400,207	421,630,400	4,497,991

Table 1: Installed Capacity of Plastics Packaging Industry

Source : TOBB (The Union of Chambers and Commodity Exchange of Turkey)

According to PAGEV data base, about 1,450 companies are operating in plastics packaging materials industry, 61% of which located in Istanbul.

More than 10 companies that operate in 14 the provinces 14 account for 93% of total companies.

3. TURKISH PLASTIC PACKAGING PRODUCTS INDUSTRY

Province	No of Companies	% Share
İstanbul	871	61
İzmir	84	6
Konya	57	4
Ankara	51	4
Bursa	51	4
Gaziantep	42	3
Kocaeli	40	3
Adana	27	2
Denizli	23	2
Mersin	17	1
Kayseri	16	1
Manisa	15	1
Samsun	13	1
Antalya	11	1
Others	105	7
Total Industry	1,423	100

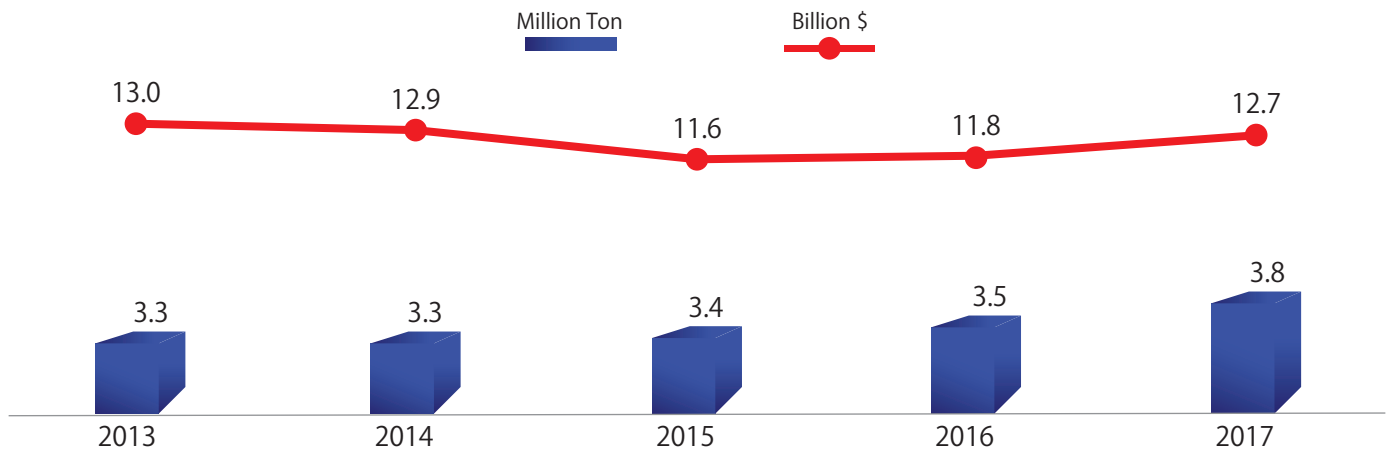
Table 2: Plastics Packaging Materials Manufacturers by Provinces

Source: PAGEV Data Base

3.2. PRODUCTION

In the last 5 years covering 2013-2017, cumulative aggregated growth rate of the plastic packaging materials production realized by 3.4% on amount and basis while decreased by 0.7% on a value basis and realized as 3.8 million tons and 12.7 billion dollars in 2017.

In 2017, the production of plastic packaging materials increased by 7.1% on amount and by 6.9% on a value basis compared to 2016.



Graphic 1: Plastics Packaging Materials Production

Source: TurkStat and ITC Trade Statistics

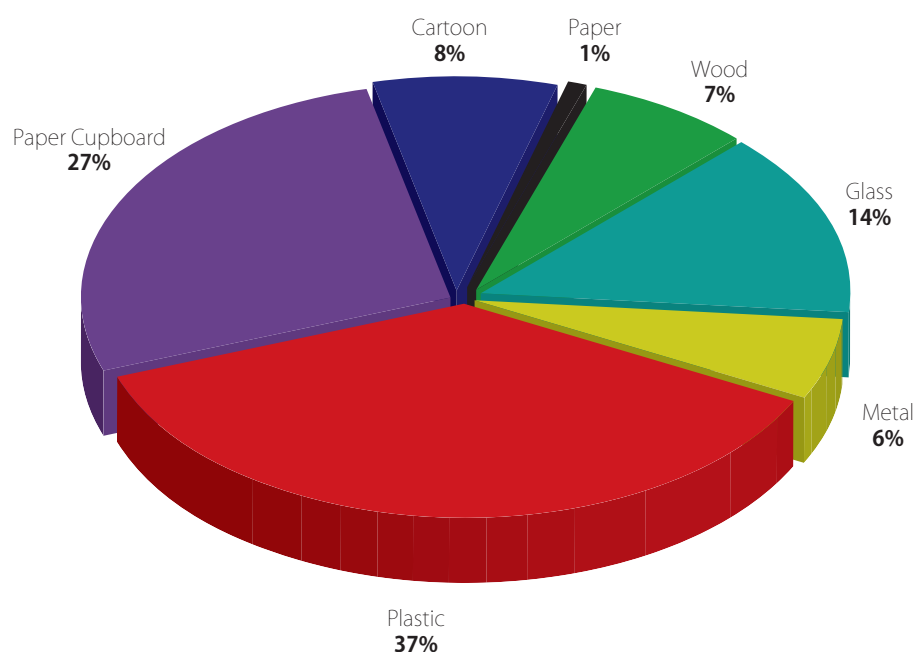
3. TURKISH PLASTIC PACKAGING PRODUCTS INDUSTRY

	2013	2016	2017	% Increase 2017/2016	CAGR % 2013 - 2017
Million Ton	3.3	3.3	3.8	7.1	3.4
Billion \$	13.0	13.0	12.7	6.9	-0.7

Table 3: Plastics Packaging Materials Production

Source: TurkStat and ITC Trade Statistics

The highest share in total packaging production in Turkey is plastic materials with 37%.



Graphic 2: Shares of Materials in Total Packaging Production in Turkey

Source: ASD Packaging Manufacturers Association

3.3. FOREIGN TRADE

Plastics packaging foreign trade can be examined by 5 HS Codes of 39.19, 39.20, 39.21 and 39.23. custom duty code numbers specified as follows with

HS CODE	Definitions
39.19	Adhesive plate, sheet, strip, slide, etc. from plastic; flat
39.20	Other plate, sheet, pellicule and slides from plastic
39.21	Other plates, sheets, pellicules, foils and slides from plastic
39.23	Plastic products for moving furniture, tap, cap, capsule

Table 4: Plastics Packaging Industry By HS Codes

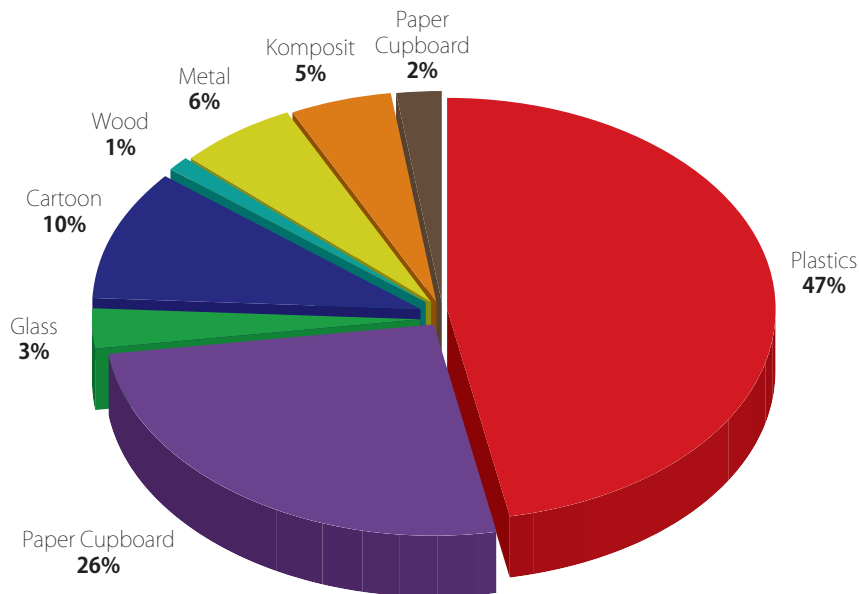
Source: TurkStat and ITC Trade Statistics

3. TURKISH PLASTIC PACKAGING PRODUCTS INDUSTRY

3.3.1. IMPORTS

Although Turkish plastics packaging is sufficient to meet the requirements of the domestic manufacturing industry with its structural and technological aspects, the materials are imported come with their own packaging materials.

As new products begin to be manufactured in Turkey, their packaging materials will be produced in Turkey and market volume will grow accordingly. The share of total imports of plastics packaging industry is 47% in total packaging imports.

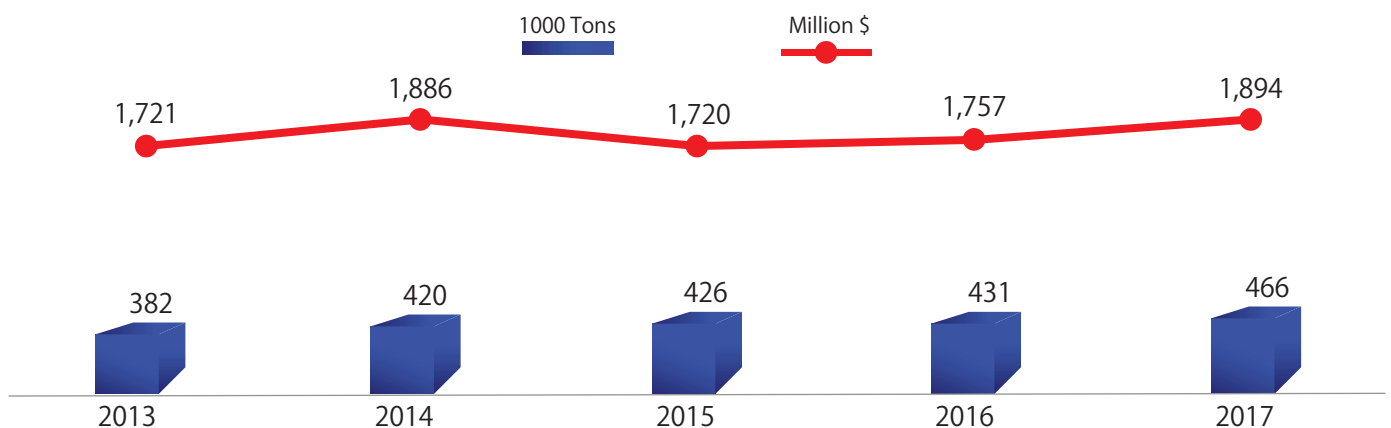


Graphic 3: Shares of Materials in Total Packaging Imports in Turkey

Source: ASD Packaging Manufacturers Association

In the last 5 years covering 2013-2017, cumulative aggregated growth rate of the plastic packaging materials imports realized by 5.1% on amount and by 2.4% on a value basis and realized as 466 thousand tons and 1.89 billion dollars in 2017.

In 2017, the imports of plastic packaging materials increased by 8.1% on amount and by 7.8% on a value basis compared to 2016.



Graphic 4: Plastics Packaging Material Imports

Source: TurkStat and ITC Trade Statistics

3. TURKISH PLASTIC PACKAGING PRODUCTS INDUSTRY

The imports of all plastics packaging materials are expected to increase both on amount and value bases by the end 2017 compare to 2016.

HS Code	2013	2016	2017	% Increase 2017/2016	CAGR % 2013-2017
39.19	54	58	61	6.4	3.3
39.20	233	249	271	9.0	3.9
39.21	58	64	70	9.7	4.8
39.23	38	61	63	4.4	13.8
	382	431	466	8.1	5.1

Table 5: Plastics Packaging Material Imports (1000 ton)

Source: TurkStat and ITC Trade Statistics

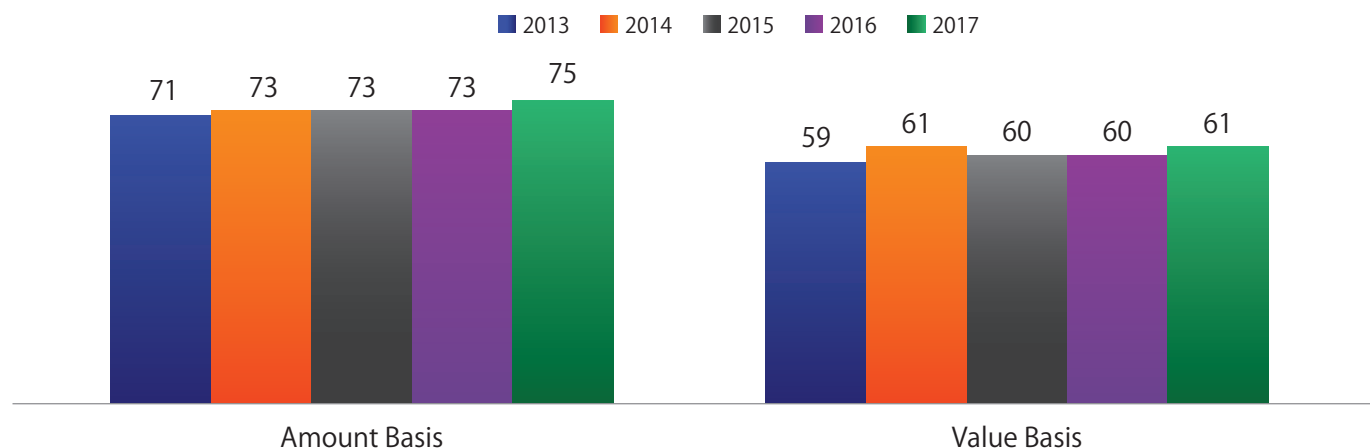
HS Code	2013	2016	2017	% Increase 2017/2016	CAGR % 2013-2017
39.19	54	331	341	3.0	1.4
39.20	233	907	999	10.1	1.6
39.21	58	250	270	8.0	3.3
39.23	38	269	284	5.7	6.0
	382	1,757	1,894	7.8	2.4

Table 6: Plastics Packaging Material Imports (USD Million) Source

Source: TurkStat and ITC Trade Statistics

While, plastics packaging materials imports shared 71% of total plastics industry's imports on amount and received 59% share on value basis in 2013,

it's share increased to 75% on amount and 61% on value basis in 2017.



Graphic 5: Share of Plastics Packaging Imports in Total Plastics End Products Imports (%)

Source: TurkStat and ITC Trade Statistics

3. TURKISH PLASTIC PACKAGING PRODUCTS INDUSTRY

3.3.2. IMPORTS BY COUNTRIES

Plastic packaging materials are imported from more than 80 countries. The share of 10 countries in total imports 72% on amount and 74% on value basis in 2017.

Germany, China, S. Korea, Italy and France made up the first 5 countries with 59% share in 2017.

Countries	1000 Tons	Million \$	Tons -%	\$ -%
Germany	71	346	15.1	18.3
China	112	316	24.0	16.7
S.Korea	33	186	7.2	9.8
Italy	43	171	9.3	9.1
France	19	95	4.0	5.0
USA	10	76	2.2	4.0
UK	11	68	2.3	3.6
Belgium	14	65	3.0	3.4
Spain	12	46	2.5	2.4
Egypt	13	36	2.8	1.9
10 Countries Total	337	1,405	72.3	74.2
Others	129	489	27.7	25.8
Total	466	1,894	100.0	100.0

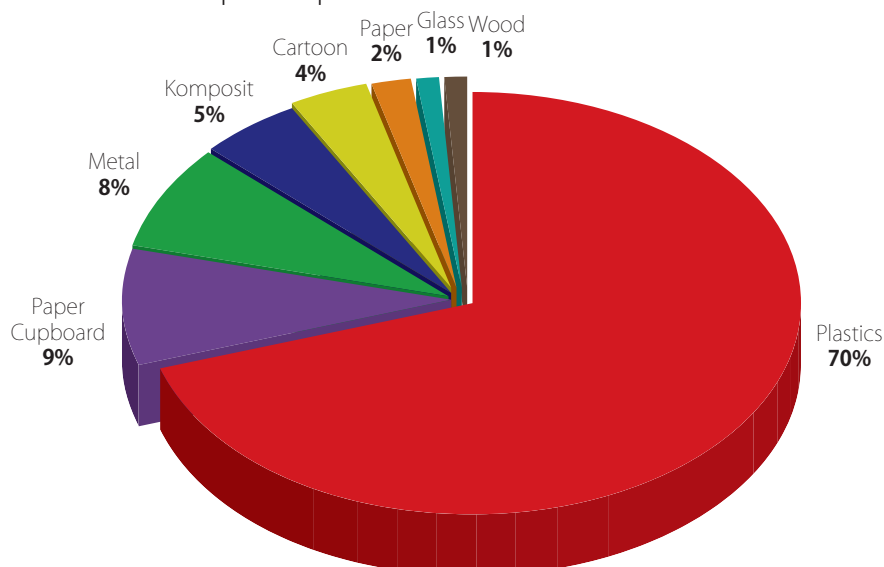
Table7: Plastics Packaging Materials Imports by Countries (2017)

Source: TurkStat and ITC Trade Statistics

3.3.3. EXPORTS

According to the ASD - Packaging Manufacturers Association records, the share of total exports of plastics

packaging industry is 70% in total packaging imports.



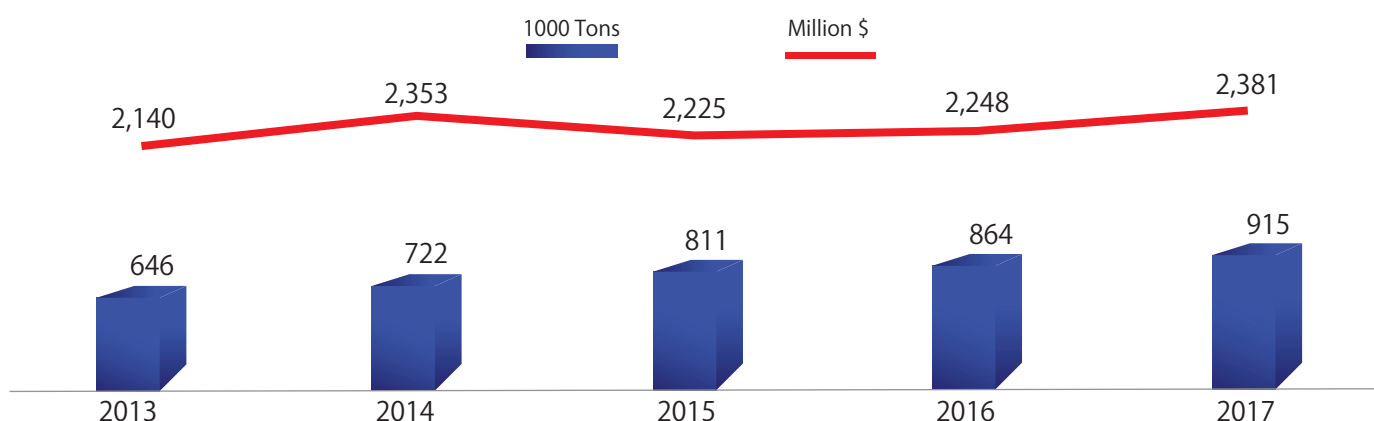
Graphic 6: Share of Plastics in Total Packaging Materials Exports

Source: ASD Packaging Manufacturers Association

3. TURKISH PLASTIC PACKAGING PRODUCTS INDUSTRY

In the last 5 years covering 2013-2017, cumulative aggregated growth rate of the plastic packaging materials exports realized by 9.1% on amount and by 2.7% on a value basis and realized as 915 thousand tons and 2.38 billion dollars in 2017.

In 2017, the exports of plastic packaging materials increased by 6% on amount and by 5.9 % on a value basis compared to 2016.



Graphic 7: Plastics Packaging Materials Exports

Source: TurkStat and ITC Trade Statistics

HS Code	2013	2016	2017	% Increase 2017/2016	CAGR % 2013-2017
39.19	20	20	20	1.0	-0.9
39.20	272	369	384	3.9	9.0
39.21	101	140	146	4.2	9.7
39.23	252	335	366	9.3	9.7
Total	646	864	915	6.0	9.1

Table 8: Plastics Packaging Materials Exports (1000 Ton)

Source: TurkStat and ITC Trade Statistics

HS Code	2013	2016	2017	% Increase 2017/2016	CAGR % 2013-2017
39.19	138	113	99	-12.5	-8.0
39.20	888	923	976	5.7	2.4
39.21	350	402	416	3.5	4.4
39.23	763	809	890	10.0	3.9
Total	2,140	2,248	2,381	5.9	2.7

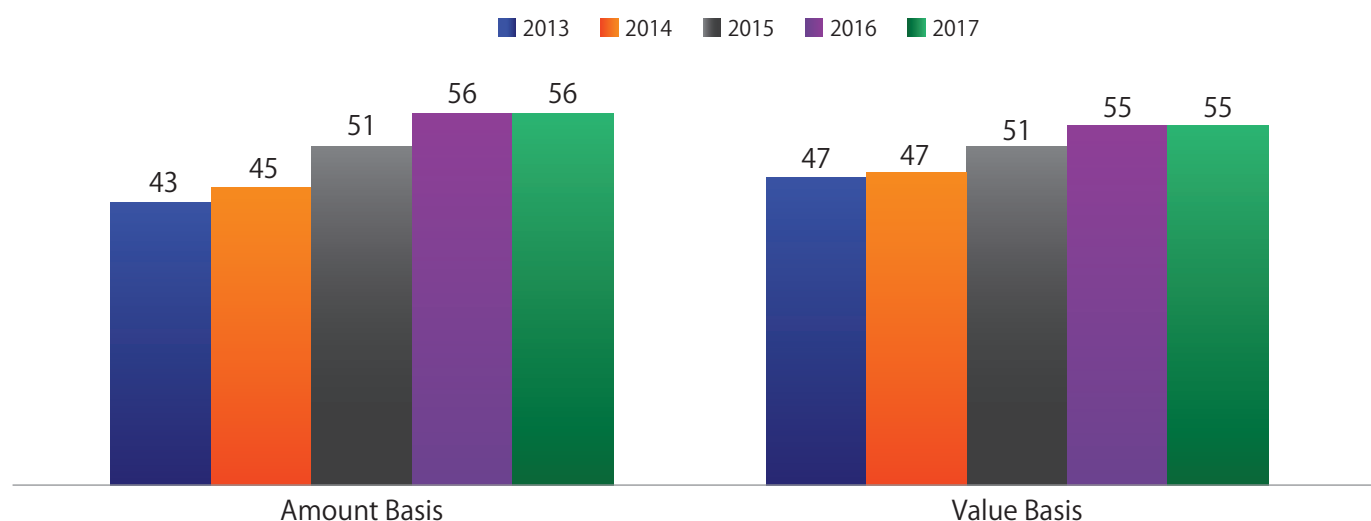
Table 9: Plastics Packaging Materials Exports (Million \$)

Source: TurkStat and ITC Trade Statistics

While, plastics packaging materials exports shared 43% of total plastics industry's exports on amount and received 47% share on value basis in 2013,

it's share increased to 56% on amount and 55% on value basis in 2017.

3. TURKISH PLASTIC PACKAGING PRODUCTS INDUSTRY



Graphic 8: Share of Plastics Packaging Exports in Total Plastics End Products Exports (%)

Source: TurkStat and ITC Trade Statistics

3.3.4. EXPORTS BY COUNTRIES

Turkey exports plastic packaging products to more than 150 countries and 10 major export partners had 49% on amount and 47% share on value base in 2017.

In this period, Germany, Iraq, UK, Italy and Israel kept their status of top 5 markets with 31% share, to which Turkey exported plastic packaging products most.

Countries	1000 Tons	Million \$	Ton -%	\$ -%
Germany	60	198	6.5	8.3
Iraq	97	168	10.6	7.1
UK	67	161	7.3	6.8
Italy	41	100	4.5	4.2
Israel	47	100	5.2	4.2
France	32	97	3.5	4.1
USA	32	78	3.5	3.3
Netherlands	23	78	2.5	3.3
Iran	20	73	2.2	3.1
Romania	25	68	2.7	2.9
10 Countries Total	444	1,122	48.5	47.1
Others	472	1,259	51.5	52.9
Total	915	2,381	100	100

Table 10: Major Export Partners For Plastics Packaging Materials (2017)

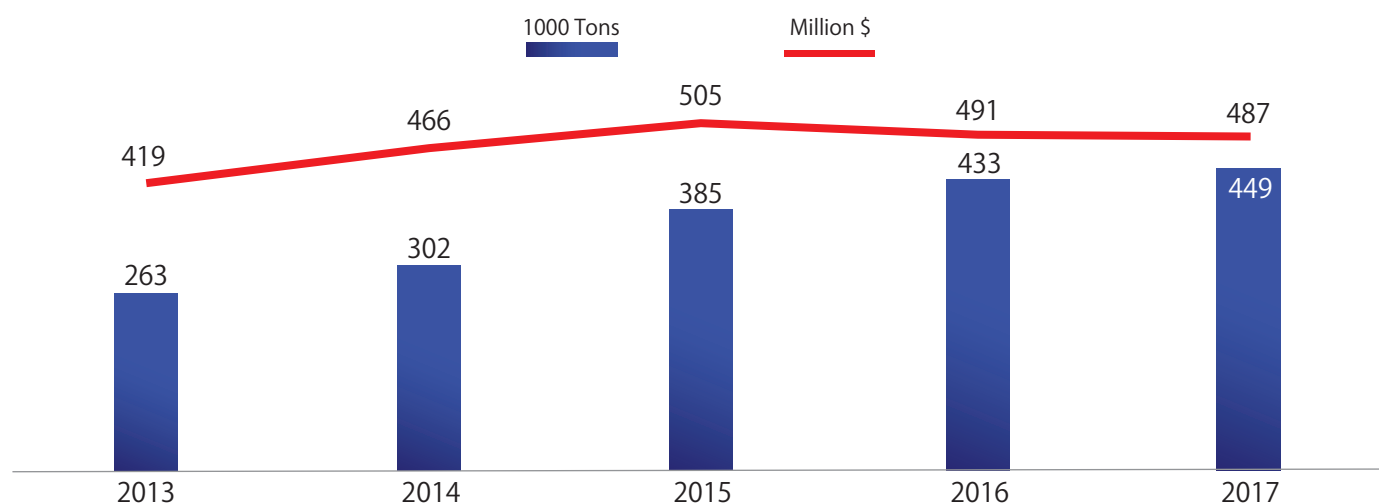
Source: TurkStat and ITC Trade Statistics

3. TURKISH PLASTIC PACKAGING PRODUCTS INDUSTRY

3.3.5. FOREIGN TRADE BALANCE

Turkey has foreign trade surplus in terms of amount and value in total foreign trade of plastic packaging products. In the last 5 years covering 2013-2017, cumulative aggregated growth rate of the plastic packaging materials foreign trade surplus realized by 14.3% on amount and by 3.9% on a value basis and realized as 449 thousand tons and 487 million dollars in 2017.

In 2017, the foreign trade surplus of plastic packaging materials increased by 3.8% on amount and decreased by 0.7% on a value basis compared to 2016.



Graphic 9: Plastics Packaging Materials Foreign Trade Surplus

Source: TurkStat and ITC Trade Statistics

HS Code	2013	2016	2017	% Increase 2017/2016	CAGR % 2013-2017
39.19	-33	-38	-41	9.2	5.7
39.20	39	121	112	-6.7	30.1
39.21	43	76	76	-0.3	15.4
39.23	215	274	302	10.4	9.0
Total	263	433	449	3.8	14.3

Table 11: Plastics Packaging Materials Foreign Trade Surplus (1000 Ton)

Source: TurkStat and ITC Trade Statistics

HS Code	2013	2016	2017	% Increase 2017/2016	CAGR % 2013-2017
39.19	-184	-218	-242	11.1	7.1
39.20	-49	16	-23	-241.4	-17.3
39.21	113	152	146	-3.9	6.6
39.23	538	540	606	12.1	3.0
Total	419	491	487	-0.7	3.9

Table 12: Plastics Packaging Materials Foreign Trade Surplus (Million \$)

Source: TurkStat and ITC Trade Statistics

3. TURKISH PLASTIC PACKAGING PRODUCTS INDUSTRY

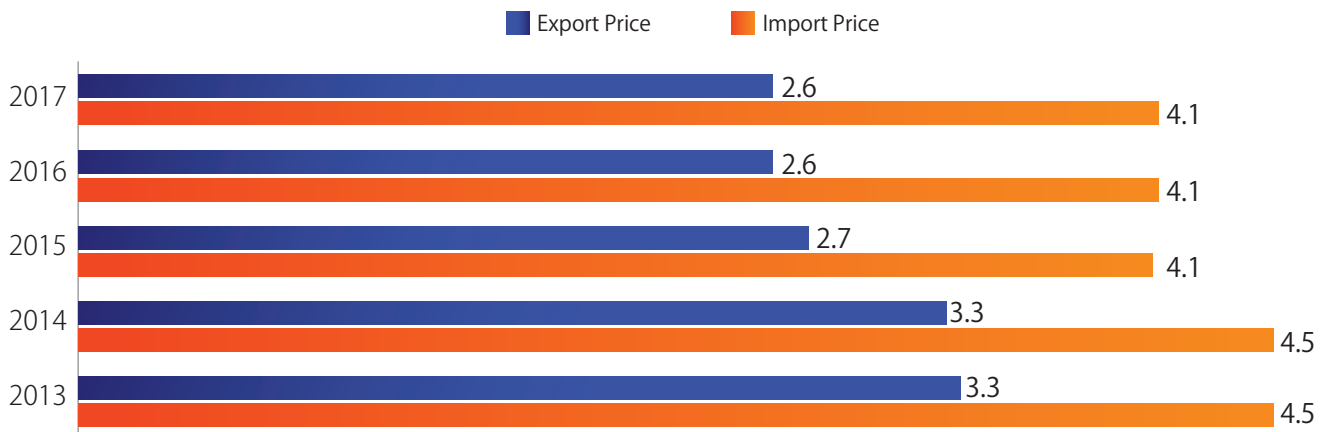
3.3.6. IMPORT AND EXPORT PRICES

Average import prices of plastic packaging products have been over the average export prices in Turkey since 2000. This shows that Turkey imports plastic packaging products with higher added-value while exporting products with lower added-value.

In the last 5 years covering 2013-2017, cumulative aggregated growth rate of the plastic packaging materials unit import prices decreased by 2.5% and

realized as 2.6 \$/kg in 2017. In 2017, the average import price decreased by 0.3% compared to 2016.

In the last 5 years covering 2013-2017, cumulative aggregated growth rate of the plastic packaging materials unit export prices decreased by 5.9% and realized as 4.1 \$/kg in 2017. In 2017, the average import price stayed at the same level compared to 2016.



Graphic 10: Plastics Packaging Materials Average Unit Foreign Trade Prices

Source: TurkStat and ITC Trade Statistics

HS Code	2013	2016	2017	% Increase 2017/2016	CAGR % 2013-2017
39.19	6.01	5.8	5.6	-3.2	-1.9
39.20	4.03	3.6	3.7	1.0	-2.2
39.21	4.07	3.9	3.9	-1.6	-1.4
39.23	5.95	4.4	4.5	1.3	-6.9
Total	4.50	4.1	4.1	-0.3	-2.5

Table 13: Average Import Prices for Plastics Packaging Materials (\$/kg)

Source: TurkStat and ITC Trade Statistics

HS Code	2013	2016	2017	% Increase 2017/2016	CAGR % 2013/2017
39.19	6.76	5.8	5.0	-13.4	-7.2
39.20	3.27	2.5	2.5	1.8	-6.1
39.21	3.47	2.9	2.9	-0.7	-4.8
39.23	3.03	2.4	2.4	0.6	-5.3
Total	3.31	2.60	2.60	0.0	-5.9

Table 14: Average Export Prices for Plastics Packaging Materials (\$/kg)

Source: TurkStat and ITC Trade Statistics

3. TURKISH PLASTIC PACKAGING PRODUCTS INDUSTRY

3.3.7. VALUE ADDED CREATED IN PLASTICS PACKAGING EXPORTS

In 2017, an additional value added of 1.2 \$/kg was created in plastic packaging materials exports.

The ratio of created value added to unit export price is 45%.

	2013	2014	2015	2016	2017
Export Price	3.3	3.3	2.7	2.6	2.6
Average Price of Plastics Raw Materials	1.8	1.8	1.5	1.3	1.4
Value Added Created	1.5	1.4	1.2	1.3	1.2
Value Added/Export Price (%)	45	44	45	49	45

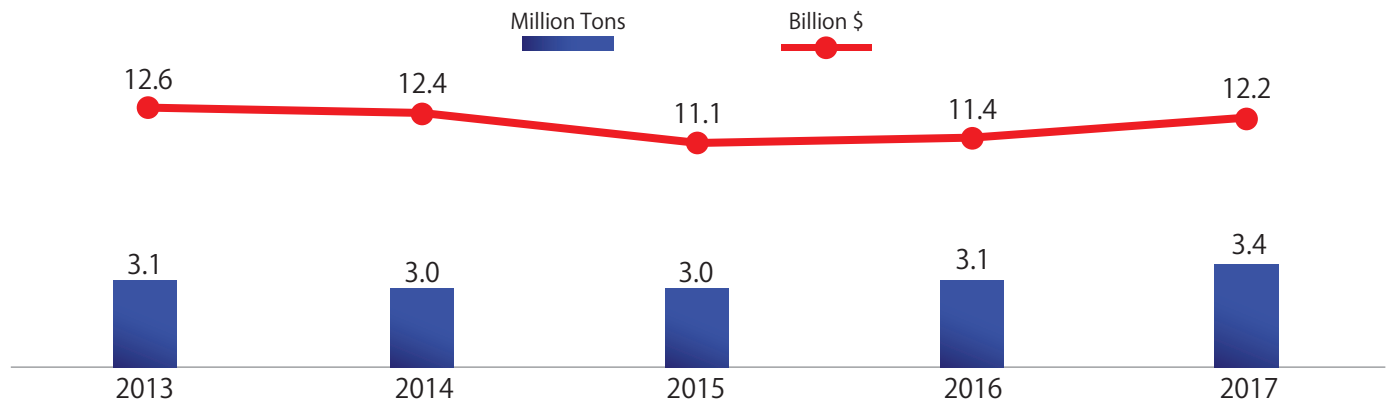
Table 15: Value Added Created in Plastics Packaging Exports (\$/kg)

Source: TurkStat and ITC Trade Statistics

4. DOMESTIC CONSUMPTION

In the last 5 years covering 2013-2017, cumulative aggregated growth rate of the plastic packaging materials domestic consumption increased by 2.3% on amount and decreased by 0.8% on a value basis and realized as 3.4 million tons and 12.2 billion dollars in 2017.

In 2017, the domestic consumption of plastic packaging materials increased by 7.6% on amount and by 7.3% on a value basis compared to 2016.



Graphic 11: Plastics Packaging Materials Domestic Consumption

Source: TurkStat and ITC Trade Statistics

	2013	2016	2017	% Increase 2017/2016	CAGR % 2013 - 2017
Million Ton	3.1	3.1	3.4	7.6	2.3
Billion \$	12.6	11.4	12.2	7.3	-0.8

Table 16: Plastics Packaging Materials Domestic Consumption

Source: TurkStat and ITC Trade Statistics

5. SUPPLY AND DEMAND EQUILIBRIUM AND 2018 ESTIMATES

Turkey, shows a faster development than the EU Countries the economies of which are more developed and relatively sophisticated packaging markets have reached saturation points.

Growing urbanization trend, the lengthening of the average life expectancy, women's increasing population of working life, the contribution of consumption habits and the expectations of consumers; developed the self-service in the central and consumer direct selling hypermarket, promotes the spread of supermarkets and supermarket chains in the entire country.

This support the development of use of retail systems packaging. Likewise, consumers in markets achieve the possibility of finding with many more varieties of cheap but good quality and reliable products, price and quality.

Apart from customer service, sale promotions, special discounts, free product coupons directs customers preferably to purchase from the store.

To sum up; the chain of shopping malls and retail sales racks and feed the order accordingly packaged product demand.

Annual average increases in plastic packaging materials over the last 5 years covering 2013-2017 on amount basis;

- 3.4% in production, 5.1% in exports, 9.1% in exports, 2.3% in domestic consumption and 14.3% in foreign trade surplus have been realized.
- In 2017, 24% of total production was exported, 14% of domestic consumption was met by imports, and the import coverage ratio of exports was 196%.

Annual average increases in plastic packaging materials over the last 5 years covering 2013-2017 on value basis;

- 2.4% in imports, 2.7% in exports, 2.3% in domestic consumption and 3.9% in foreign trade surplus have been realized. On the other hand, production in this period declined by 0.7% on average and domestic
- consumption declined by 0.8%. In 2017, 19% of total production was exported, 16% of domestic consumption was covered by imports, and the import coverage ratio of exports was 126%.

	2013	2016	2017	% Increase 2017/2016	CAGR % 2013-2017	2018/E
Production	3,327	3,547	3,800	7.1	3.4	3,928
Imports	382	431	466	8.1	5.1	490
Exports	646	864	915	6.0	9.1	999
Domestic Consumption	3,064	3,114	3,351	7.6	2.3	3,419
Foreign Trade Surplus	263	433	449	3.8	14.3	509
Export/Production(%)	19	24	24			25
Imports/Domestic Consumption(%)	12	14	14			14
Exports/Imports(%)	169	200	196			204

Table 17: Supply and Demand Equilibrium in Plastics Packaging Materials (1000 Ton)

Source: TurkStat and ITC Trade Statistics

5. SUPPLY AND DEMAND EQUILIBRIUM AND 2018 ESTIMATES

	2013	2016	2017	% Increase 2017/2016	CAGR % 2013-2017	2018/E
Production	13,006	11,844	12,664	6.9	-0.7	12,580
Imports	1,721	1,757	1,894	7.8	2.4	1,939
Exports	2,140	2,248	2,381	5.9	2.7	2,445
Domestic Consumption	12,587	11,353	12,177	7.3	-0.8	12,074
Foreign Trade Surplus	419	491	487	-0.7	3.9	506
Export/Production(%)	16	19	19			19
Imports/Domestic Consumption(%)	14	15	16			16
Exports/Imports(%)	124	128	126			126

Table 18: Supply and Demand Equilibrium in Plastics Packaging Materials Industry (Million \$)

Source: TurkStat and ITC Trade Statistics

It is expected that 19% on amount and 24% on value basis of total production will be exported in 2018, and

14% on amount and 16% on value basis of total domestic consumption will be met by imports.

6. CONCLUSION

Plastics, through innovative technologies, are becoming increasingly sophisticated, lightweight, versatile and has replaced the traditional packaging materials such as glass and paper in many areas. Previously, classical materials such as paper, glass, and traditional packaging materials such as wood, cellulose acetate and cellophane transparent cellulose film were used, plastic packaging materials placed with polyethylene in the 1950's and has been widely used. Rapid increase in the use of plastics has been realized with the development of polystyrene, polypropylene, PVC, polyester and polyethylene copolymers.

Despite the size and economic importance of the industry (especially SMEs) of the plastic packaging industry is currently under significant pressure two. On the one hand to determine the price of plastic raw material suppliers, notably in the food industry as well others, great pressure is applied to the lowering of prices by customers. In addition, in many countries, especially in Eastern Europe, particularly if they have a quality manufacturer of extrusion and printing facilities at lower costs and therefore competition in these countries are known to increase rapidly.

Competition from others, especially from the Far East side barrier material and printing technology is a growing field.

Food packaging, which accounts for 54% of the total market in terms of product areas and is the largest area of the entire packaging industry, is known to be the most important growth market for plastic packaging. The growth of the market contributes to demographic developments such as the increase in the number of homes and aged one or two people live.

Innovation is also an important factor in its success in this sector. Companies that use R&D intensively in the plastic packaging industry to develop new products that are easy to use for the market will have a strategic advantage compared to their competitors. In developed countries, the plastic packaging industry makes use of R&D to open new markets both in the packaging sector and in similar areas.

6. CONCLUSION

In recent years there has been a reduction in the volume of plastics used for packaging by an average of close to 30%, with 78% of films used for palletizing and 27% of containers of yellow oil products falling during the same period. Looking to the future, it is predicted that the efficiency of multi-material processes will continue to open new horizons in areas such as breathable packages for packaging plastics.

The raw materials and machinery and raw materials suppliers enter into closer global cooperation in the plastic packaging industry, plastics packaging industry in the coming years;

- Increased globalization in the world plastic packaging industry will result for especially small and medium-sized plastic processors in particular, the merger of the companies and even go to more and
- more cooperation, It will also create opportunities for the companies that develop new products and manufacture them will offer more added value,
- The plastics packaging industry comes increasingly into a service industry with international services, timely delivery and e-commerce, Outsourcing for customers and full service packages is being more important in the plastics packaging industry,

Export of plastic packaging products in 2023 is expected to reach USD billion of 5.5 in order to achieve this goal; target markets and of products to be exported to these market (traditional and larger value-added) must be identified, conducting market researches for these products, the presentations of the selected product in the target market, making B2B meetings, delegation visits and active participation in fairs to be obtained as the main actions.

Another strategy is: to become a global center of excellence in producing innovative products in Turkey, the main actions that can be done for this purpose are;

To produce technological products, to set priorities on R&D investments, create development policies, take best practices of the leading countries and organizations in the packaging industry as a model, develop mechanisms to encourage mergers to increase the international competitiveness, to identify the R&D needs of the plastic packaging industry to establish scientific works in universities to increase innovative activities.

7. PAGEV PROJECTS

As the "uniting force" of the plastics industry, PAGEV develops various projects to address the above issues. The two leading initiatives are the "PAGEV Plastics Center of Excellence" and "International Regional Plastic Production Hub".

7.1. PAGEV PLASTICS CENTER OF EXCELLENCE

Plastics are used in every aspect of life and are quick to replace other materials due to their outstanding properties. Plastics are gaining currency in all sectors and are set to become the indispensable material of the 21st century. Although the Turkish plastics industry is young, it is quick to grow, and is already the 2nd largest in Europe and 6th largest in the world.

Striving to become a leader in Europe, the Turkish plastics industry aims to achieve certification on more products and improve added value. As the "uniting force" of the plastics industry, PAGEV leads the industry to achieving this target with the "PAGEV Plastics Center of Excellence". The planned mission of the PAGEV Plastics Center of Excellence will include the following activities:

- Research and Development
- Testing and Laboratory Services
- Certification
- Training
- Competent Consultancy

7. PAGEV PROJECTS

The Center of Excellence will provide testing and laboratory services, eliminating the current high costs, customs procedures and long waiting times associated with sending samples abroad for testing. PAGEV Plastics CoE will develop platforms needed for sharing information and knowhow across the industry, and in-depth training curricula will be offered to the industry's benefit. The CoE will work on the latest technologies while cooperating with industrial companies, universities, research institutions, professional associations and nongovernmental organizations with an ultimate purpose of making the Turkish plastics industry a global leader.

Supported by the Ministry of Industry and Technology, the PAGEV Plastics Center of Excellence will help to train industrial skills and talent that will provide the foundation of national projects, providing a boost to the plastics industry in particular, and the Turkish economy in general. The PAGEV Plastics Center of Excellence will be a product of strategic partnership which will encourage scientific research with traceable objectives and a high potential for commercialization in order to accelerate the growth of the plastics industry. The CoE is under construction next to the PAGEV Vocational and Technical High School in Küçükçekmece, Istanbul, and when complete, it will have over 30,000 square meters of space. The PAGEV Plastics Center of Excellence will make Turkey the hub of plastic production in the world and develop innovative projects.

The Center will also act as a controlling body for export products, which will ensure that plastic products made in Turkey will enjoy better trust and reputation in global markets. Another benefit of the Center will be tests performed on imported plastics before they are admitted through customs, which will prevent non-standard products of poor quality from entering the market.

The Center will be a more cost-effective and faster provider of certification, accelerate the development of the industry through R&D efforts, improve the competitive strength of Turkish companies, and focus on the development of product and manufacturing technologies.

The Center will follow developments in the global plastics industry to create innovative ideas, and offer consultancy services from determining appropriate input materials to designing process optimization to improve the competitive ability of the industry.

7.2. INTERNATIONAL REGIONAL PLASTIC PRODUCTION HUB

Although the Turkish plastics industry is the 2nd largest in Europe and 6th largest in the world with a production capacity of nearly 9 million tons, over 85% of the raw materials it requires is still imported. One key advantage of the Turkish plastics industry is its location between Middle Eastern countries which produce petroleum and other plastic raw materials, and Europe, which is the main consumer of plastic goods. To turn geographical location into an advantage, PAGEV plans to build a plastic production hub of international presence in the Southeast Anatolia region of Turkey, where the plastic raw material production potential of Middle Eastern countries will serve the product manufacturing skill and knowledge available in Turkey. Built on a win-win approach, the hub will enable raw material producers to access a large and reliable market, while the Turkish plastics industry will benefit from inexpensive and reliable raw material supply, growing even more, and taking advantage of lower costs to compete in global markets.

CONNECTING POWER OF PLASTICS INDUSTRY



PAGEV

PAGEV is member of;

PlasticsEurope
Association of Plastics Manufacturers



www.pagev.org

Halkalı Caddesi No: 132/1 Tez-İş İş Merkezi Kat: 4 Sefaköy- İstanbul
Tel. +90 (212) 425 13 13 Fax. +90 (212) 624 49 26 E-Mail. pagev@pagev.org.tr