



**PAGEV**



**TURKISH RAW MATERIAL INDUSTRY  
FOLLOW-UP REPORT  
2017**



## 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 EROĞLU**  
**PAGEV Chairman**



**PAGEV**



**POLYETHYLENE (PE) INDUSTRY  
FOLLOW-UP REPORT  
2017**

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## 1. PLASTIC RAW MATERIALS COVERED BY THE REPORT

HS code of 39.01.10.10.00.00 Linear Low Density Polyethylene-LLDPE, 39.01.10.90.00.11 Low Density Polyethylene-LDPE, 39.01.20.90.00.11 and High Density

Polyethylene-HDPE analyzed separately and all other ethylene polymers in HS Code of 39.01 are considered as other polyethylene.

HS Code	Description
39.01	Ethylene polymers (in the first form):
3901.10	Polyethylene with a specific gravity of less than 0.94:
3901.10.10.00.00	Linear polyethylene
	Others
3901.10.90.00.11	Low density polyethylene
3901.10.90.00.12	Polyethylene compounds
3901.10.90.00.19	Others
3901.20	Polyethylene with a specific gravity of 0.94 or more:
3901.20.10.00.00	Polyethylene (one of the forms indicated in note 6 (b) of this chapter, at 23 ° C Specific mass of 0.958 or more, 50 mg / kg. Or less aluminum, 2 mgr. /kg. Or less calcium, 2 mgr. /kg. Or less chromium, 2 mgr. /kg. Or less iron, 2 mgr. /kg. Or less nickel, 2 mgr. /kg. Or less titanium 8 mg / kg. Or less chlorosulphated polyethylene containing vanadium immingle Special
	Others
3901.20.90.00.11	Others
3901.20.90.00.12	High density polyethylene
3901.20.90.00.19	Polyethylene feeds
3901.30.00.00.00	Others
3901.90	Ethylene-vinyl acetate copolymers
3901.90.30.00.00	Others
	Ethylene terpolymer salt with isobutyl acrylate and meth acrylic acid containing ionomer rosin ; A-B-A block copolymer of polystyrene, ethylene-butylene copolymer And polystyrene (containing 35% or less by weight styrene) (Which is one of the forms specified in note 6 (b) of this Chapter)
3901.90.90.00.11	Others
3901.90.90.00.12	Others
3901.90.90.00.19	Ethylene propylene copolymer

**Table 1: Plastics Raw Materials Covered by the Report**

Source: TurkStat and ITC Trade Statistics

## 2. PRODUCTION CAPACITY

Petkim is the only company in Turkey, producing polyethylene(PE). Total installed capacity of Petkim is to produce 446 thousand tons of polyethylene (PE) a year 190 thousand tons of which is for low density

polyethylene (LDPE), 160 thousand tons of low density polyethylene tabular (LDPE-T) and 96 thousand tons for high density polyethylene (HDPE).

	LDPE (Low Density Polyethylene)	LDPE - T (Low Density Polyethylene Tabular)	HDPE (High Density Polyethylene)
Date of Operation	19.04.1985	24.05.2005	23.07.1985
Initial Capacity	165.000 Ton/Year	120.000 Ton/Year	44.000 Ton/Year
History of Extension	1992	2011	1993,2001
After Extension Capacity	190.000 Ton/Year	160.000 Ton/Year	96.000 Ton/Year
Main Entries	Ethylene LDPE (F2-12, G03-5, H2-8,S07-21A)	Ethylene, Propylene, Propane LDPE - T (G03-21T, G08-21T, G08-21TA, F2-21T, H2-21T, H2-26T, H5-21T, F5-21T, I22-19T, I10-19T)	Ethylene HDPE Injection ( I668 (UV), I668 ) Blow Molding ( S0464, S0452, S00356 ) Trench ( B0153, B00552 ) Film ( F00556, F00756 )

**Table 2: Petkim Annual Production Capacity of Polyethylene**

Source: Petkim Annual Reports

Petkim started to produce low density polyethylene (LDPE) in 1985 with a capacity of 165,000 tons and increased its production capacity to 190,000 tons in 1992. The main uses of LDPE produced by the company are; heavy duty pouch, greenhouse cover, packaging film, cable sheathing, household goods, toys, pipes, hoses, tubes, bottles, fabric and metal coatings, rotations and molding materials.

In 2005, Petkim by establishing a new factory, started the production of low density polyethylene tabular (LDPE-T) with a capacity of 120,000 tons/year and invested to increase the production capacity to 160,000 tons in 2011. The main uses of LDPE-T manufactured by the company are: heavy duty bag, greenhouse cover, packaging film, cable sheathing, household goods, toys, pipes, hoses, tubes, bottles, fabric and metal coatings, rotations and molding materials.

Petkim started producing HDPE with a capacity of 44,000 tons/year in 1985 and increased production capacity of HDPE by 96,000 tons/year with the investments realized in 1993 and 2001. The main uses of HDPE produced by PETKİM are: household goods, toys, packaging films, pressurized water and natural gas pipes, detergents and cosmetics bottles (non-transparent), water, gas etc. Canister, sheet, casing paper, fabric and metal coverings, forming rotational molding.

### 3. PRODUCTION AND CAPACITY UTILIZATION

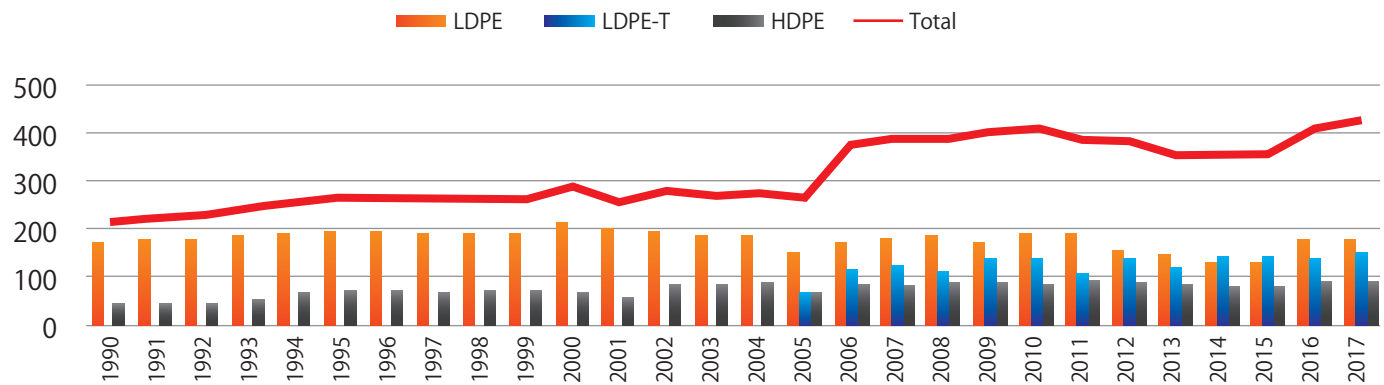
The production of polyethylene by Petkim in the period of 2013-2017 are given in table and graphic below. The company's polyethylene production reached to 424 thousand tons in 2017.

The share of LDPE realized as 45%, LDPE-T as 33% and HDPE as 22% in total polyethylene production in 2017.

	1000 Tons				Share in Total PE Production (%)		
	LDPE	LDPE-T	HDPE	TOTAL	AYPE	AYPE-T	YYPE
2013	148	121	85	354	42	34	24
2014	133	143	79	355	37	40	22
2015	133	143	79	355	37	40	22
2016	162	136	82	379	43	36	22
2017	181	152	91	424	43	35	22

**Table 3: Petkim PE Production (1000Tons)**

Source: PETKIM Annual Reports



**Graphic 1: PETKIM PE Production**

Source: PETKIM Annual Reports

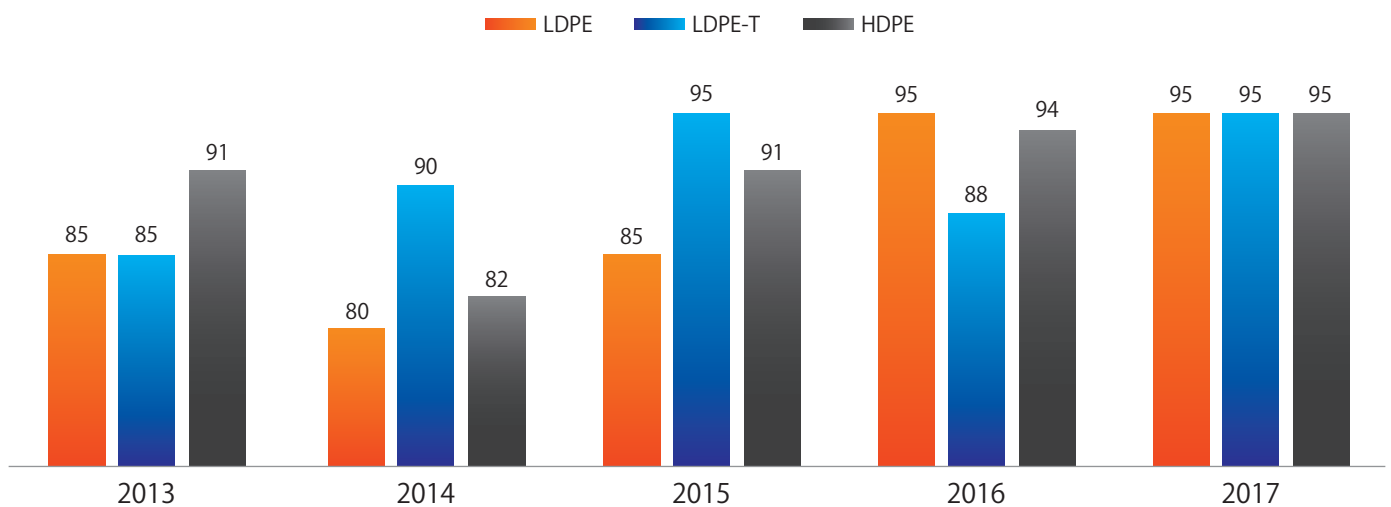
### 3. PRODUCTION AND CAPACITY UTILIZATION

Capacity utilization of Petkim for the last 5 years is shown in the following table. Capacity utilization

realized as 95% for LDPE, 85% for LDPE-T and 91% for HDPE in 2017.

	LDPE	LDPE-T	HDPE
2013	85	85	91
2014	80	90	82
2015	85	95	91
2016	95	88	94
2017	95	95	95

**Table 4: Petkim's Capacity Utilization for PE Production (%)**  
Source: PETKIM Annual Reports



**Graphic 2: Petkim's Capacity Utilization for PE Production (%)**  
Source: Petkim Annual Reports



## 4. FOREIGN TRADE

### 4.1. IMPORTS

Total polyethylene imports of Turkey realized in the last 5 years covering 2013-2017, have increased by 4.8% per annum and reached to 1 million 814 thousand tons. Total imports increased by 6.1% in 2017 compared to 2016.

The import of LLDPE, which increased by an average of 9.1% per annum between 2013 and 2017 reached to 462 thousand tons.

The import of LDPE, which increased by an average of 1.8% per annum between 2013 and 2017 reached to 315 thousand tons.

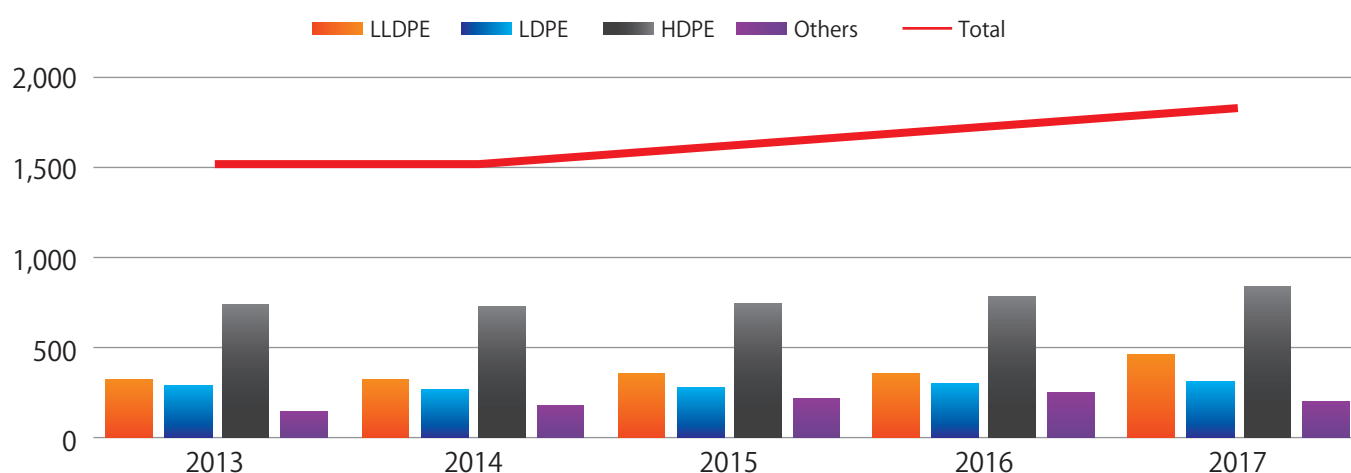
The import of HDPE, which increased by an average of 3.1% per annum between 2013 and 2017 reached to 835 thousand tons.

For the other polyethylene types other than LLDPE, LDPE and HDPE, the annual compound growth rate of imports have been as high as 8.7% in the last 5 years. Imports of these products decreased by 21.8% in 2017 compared to 2016.

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
LLDPE	326	360	462	9.1	28.4
LDPE	294	306	315	1.8	2.9
HDPE	740	786	835	3.1	6.3
Others	144	258	202	8.7	-21.8
Total Imports	1,505	1,710	1,814	4.8	6.1

**Table 5: Turkey's Imports of PE (1000Ton)**

Source: TurkStat and ITC Trade Statistics



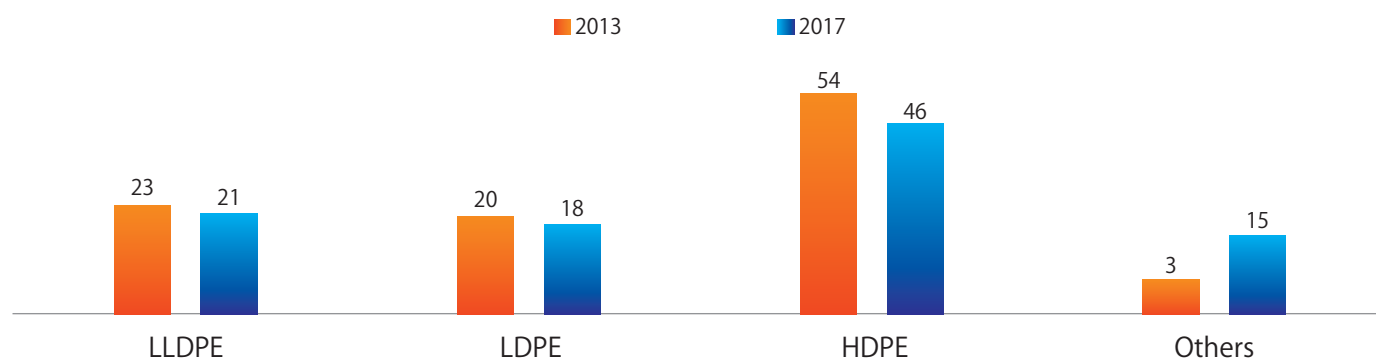
**Graphic 3: Turkey's Imports of PE (1000Tons)**

Source: TurkStat and ITC Trade Statistics

## 4. FOREIGN TRADE

Turkey's total polyethylene imports in 2017 on a quantity basis constituted 21% LLDPE, 18% LDPE,

46% HDPE and 15% other polyethylene grades.



**Graphic 4: PE Imports of Turkey by Grades (Ton - %)**

Source: TurkStat and ITC Trade Statistics

The total polyethylene imports of Turkey in terms of value in the last 5 years covering 2013-2017, decreased by 1.1% per annum and declined to 2 billion 442 million dollars from 2 billion 557 million dollars in 2017. Total imports increased by 4.3% in 2017 compared to 2016.

The import of LLDPE, which annually increased by 2.9% reached to 572 million dollars in 2017 increasing by 4.3% compared to 2016.

The import of LDPE, which annually decreased by 2.4% declined to 504 million dollars in 2017 decreasing by 6.7% compared to 2016.

The import of HDPE, which annually decreased by 3.7% increased to 1 billion 43 million dollars in 2017 decreasing by 6.7% compared to 2016.

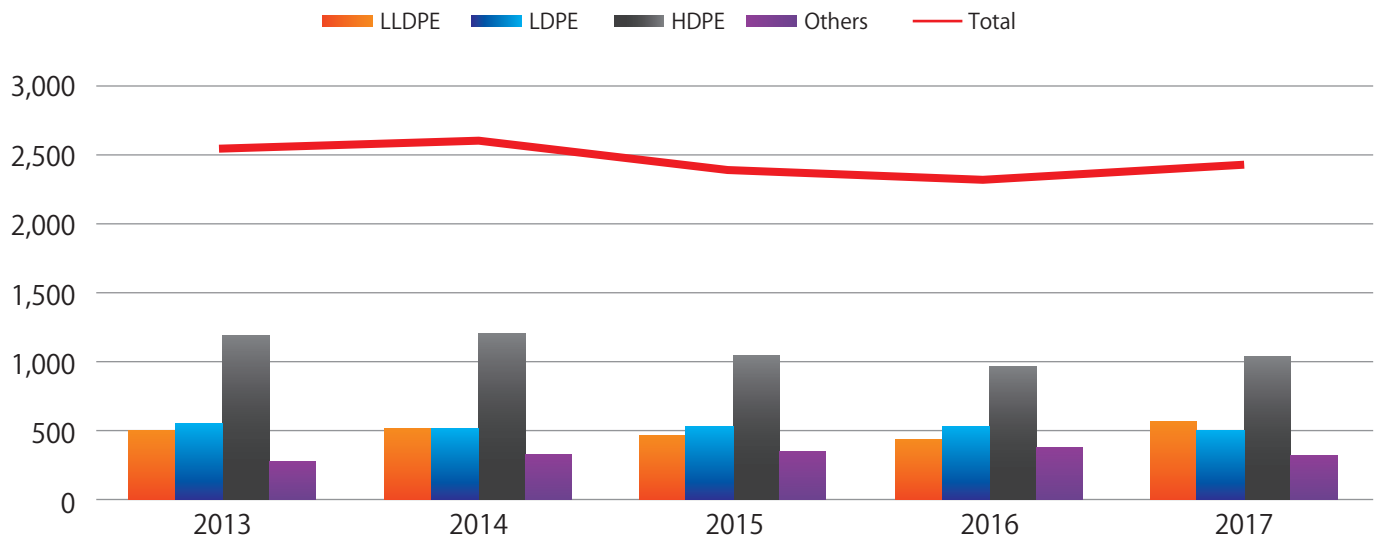
As in imports on amount basis, for the other polyethylene types other than LLDPE, LDPE and HDPE, the annual compound growth rate of imports is 3.7% in the last 5 years and Imports of these types of polyethylene realized as 324 million dollars in 2017 decreasing by 15.6% with respect to 2016.

	2013	2016	2017	CAGR % 2013-2017	% Increase (2017/2016)
LLDPE	510	440	572	2.9	30.0
LDPE	554	540	504	-2.4	-6.7
HDPE	1,213	977	1,043	-3.7	6.7
Others	280	384	324	3.7	-15.6
Total Imports	2,557	2,341	2,442	-1.1	4.3

**Table 6: Turkey's Imports of PE (Million \$)**

Source: TurkStat and ITC Trade Statistics

## 4. FOREIGN TRADE

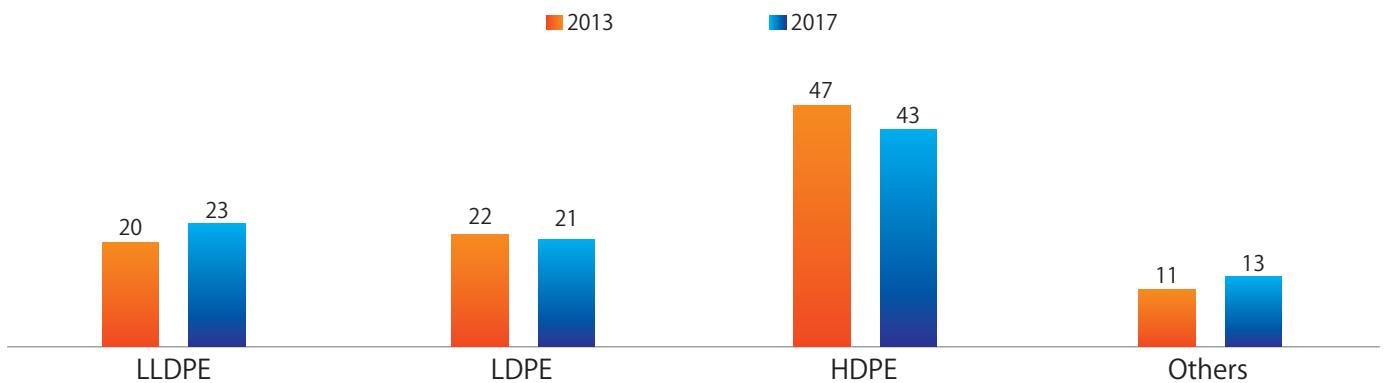


**Graphic 5: Turkey's Imports of PE (Million \$)**

Source: TurkStat and ITC Trade Statistics

Turkey's total polyethylene imports in 2017 on value basis constituted 43% for HDPE, 23% for LLDPE, 21% for

LDPE and 13% other polyethylene grades.



**Graphic 6: PE Imports of Turkey by Grades (\$-%)**

Source: TurkStat and ITC Trade Statistics

## 4. FOREIGN TRADE

The share of polyethylene imports in total plastic raw material imports was 25% on a quantity basis and 24% on a value basis in 2017.

It is observed that in the past years this ratio has been realized at the level of these levels.

	2013	2016	2017
Amount Basis	25	26	25
Value Basis	23	27	24

**Table 7: Share of Polyethylene Imports in Total Plastic Raw Materials Imports (%)**

Source: TurkStat and ITC Trade Statistics

### 4.2. EXPORTS

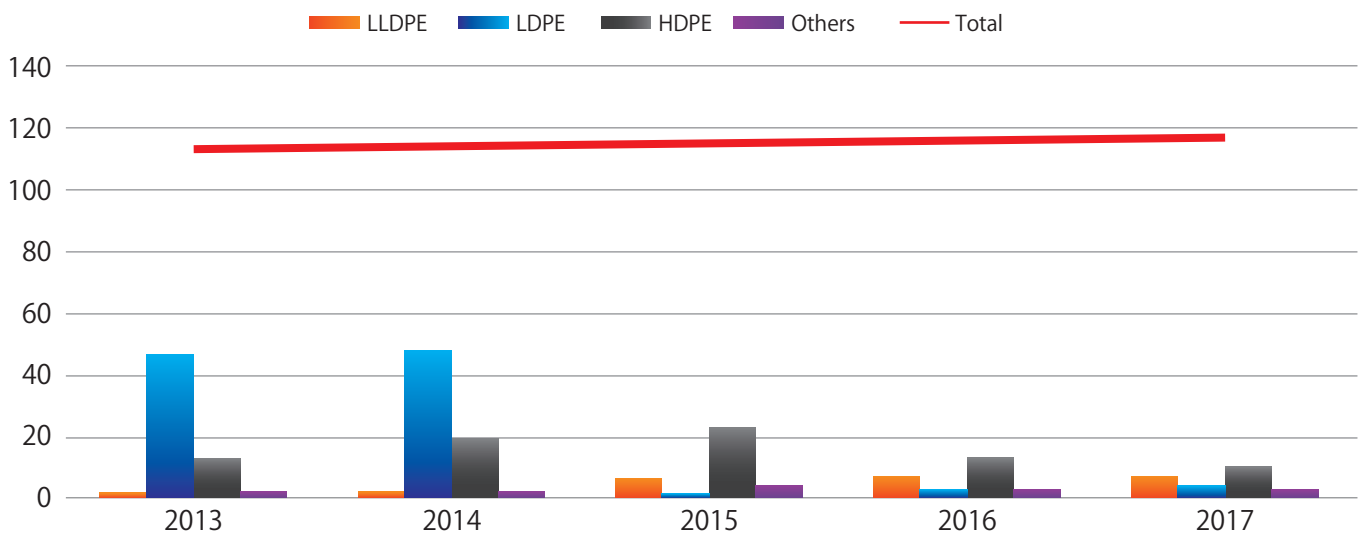
Turkey's total polyethylene exports, which amounted to 64 thousand tons in 2013, decreased by 21.4% on average annually in the last 5 years, declined to

24 thousand tons in 2017. Exports increased by 7.1% in 2017 compared to 2016.

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
LLDPE	1	7	7	48.1	-2.3
LDPE	47	3	4	-45.0	55.8
HDPE	13	13	10	-7.0	-25.3
Others	3	3	3	6.3	5.3
Total Exports	113	116	117	-21.4	-7.1

**Table 8: Turkey's Polyethylene Exports (1000 Ton)**

Source: TurkStat and ITC Trade Statistics



**Graphic 7: Turkey's Polyethylene Exports (1000 Ton)**

Source: TurkStat and ITC Trade Statistics

## 4. FOREIGN TRADE

In 2017, total polyethylene exports consisted of 28% for LLDPE, 17% LDPE, 41% for HDPE and 13% other polyethylene grades.

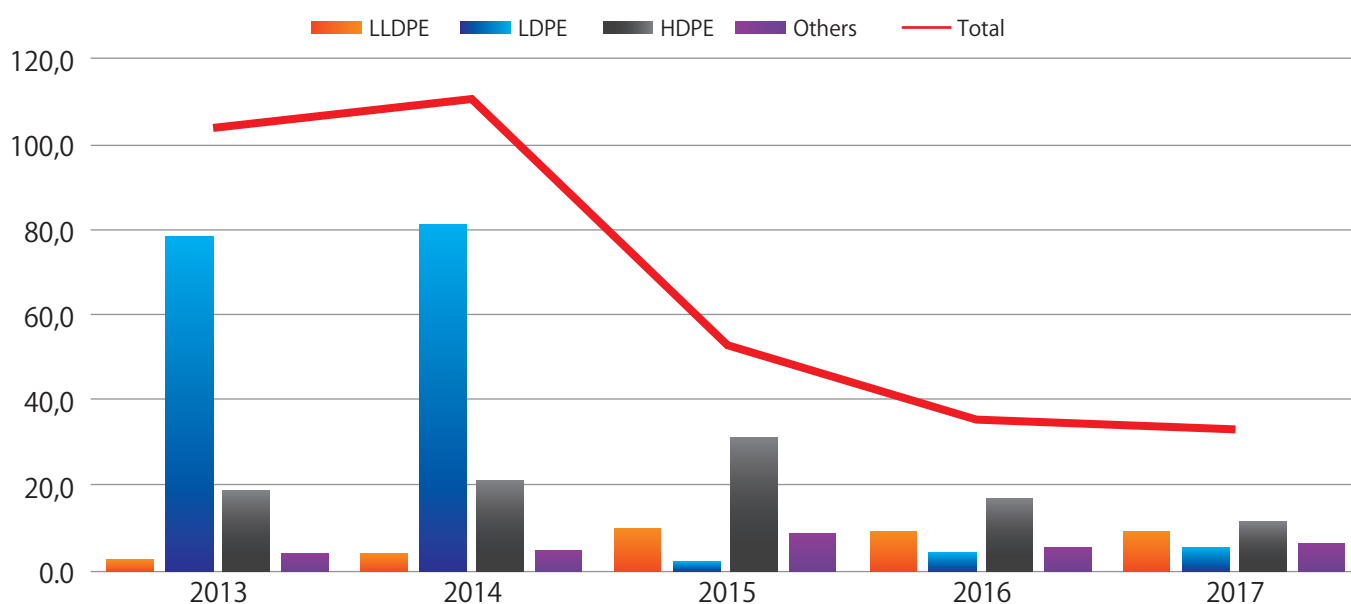
	2013	2017
LLDPE	2	28
LDPE	73	17
HDPE	21	41
Others	4	13

**Table 9: Total Polyethylene Exports By Grades (Ton - %)**  
Source: TurkStat and ITC Trade Statistics

Turkey's total polyethylene exports which was 103 million tons in 2013 decreased by an average of 25.2% per annum in the last 5 years and declined to 32 million dollars in 2017 decreasing by 7.1% compared to 2016.

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
LLDPE	3	9	9	36.2	-0.2
LDPE	78	4	6	-48.3	31.5
HDPE	19	16	11	-12.1	-31.7
Others	4	5	7	13.7	22.7
Total Exports	103	35	32	-25.2	-7.7

**Table 10: Polyethylene Exports of Turkey (Million\$)**  
Source: TurkStat and ITC Trade Statistics



**Graphic 8: Polyethylene Exports of Turkey (Million\$)**  
Source: TurkStat and ITC Trade Statistics

## 4. FOREIGN TRADE

In 2017, total polyethylene exports on value basis consisted of 28% for LLDPE, 17% for LDPE, 35% for HDPE and 20% for other polyethylene grades.

	2013	2017
LLDPE	3	28
LDPE	75	17
HDPE	18	35
Others	4	20
Total Exports	100	100

**Table 11: Exports of Polyethylene by Types (\$ - %)**

Source: TurkStat and ITC Trade Statistics

The share of polyethylene exports in total plastics raw material exports was 14% on amount and 13% on value basis in 2017.

	2013	2016	2017
Amount Basis	11	10	14
Value Basis	10	10	13

**Table 12: Share of Polyethylene Exports in Total Plastics Raw Materials Exports (%)**

Source: TurkStat and ITC Trade Statistics

### 4.3. FOREIGN TRADE DEFICIT

Turkey provides foreign trade deficit in polyethylene on both amount and value basis. The polyethylene trade deficit annually increased by 5.1% on amount and decreased by 0.5% for the last 5 years.

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
LLDPE	-325	-353	-455	8.8	29.1
LDPE	-247	-303	-311	5.9	2.5
HDPE	-727	-773	-825	3.2	6.8
Others	-142	-255	-199	8.8	-22.1
Total Deficit	-1,391	-1,594	-1,697	5.1	6.5

**Table 13: Foreign Trade Deficit for Polyethylene in Turkey (1000Ton)**

Source: TurkStat and ITC Trade Statistics

## 4. FOREIGN TRADE

In 2017, foreign trade deficit realized by 1 million 687 tons and 2 billion 410 million dollars increasing by 6.5% on amount and 4.5% on value basis compared to 2016.

The highest foreign trade deficit was realized in HDPE with 885 thousand tons and 1 billion 31 million dollars in 2017.

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
LLDPE	-508	-431	-563	2.6	30.6
LDPE	-476	-536	-498	1.1	-7.0
HDPE	-1,194	-961	-1,031	-3.6	7.4
Others	-276	-378	-317	3.5	-16.1
Total Deficit	-2,454	-2,306	-2,410	-0.5	4.5

**Table 14: Foreign Trade Deficit for Polyethylene in Turkey (Million\$)**

Source: TurkStat and ITC Trade Statistics

### 4.4. IMPORTS BY COUNTRIES

In 2017, Turkey has realized 70% of total polyethylene imports on amount and 68% on value basis from 10 countries, in this period, S. Arabia, Iran, S. Korea,

Singapore and Uzbekistan have made the top 5 polyethylene import partners of Turkey.

Ülke	1000 Tons	Million \$	% Share (Ton)	% Sharet (\$)
S. Arabia	457	564	25	23
Iran	235	271	13	11
S.Korea	124	171	7	7
Singapore	72	93	4	4
Uzbekistan	71	83	4	3
Spain	69	104	4	4
Belgium	66	106	4	4
Italy	62	91	3	4
Germany	60	101	3	4
Egypt	58	71	3	3
10 Countries Total	<b>1,274</b>	<b>1,655</b>	<b>70</b>	<b>68</b>
Others	<b>540</b>	<b>787</b>	<b>30</b>	<b>32</b>
Total	<b>1,814</b>	<b>2,442</b>	<b>100</b>	<b>100</b>

**Table 15: Polyethylene Imports by Countries (2017)**

Source: TurkStat and ITC Trade Statistics

## 4. FOREIGN TRADE

### 4.5. EXPORTS BY COUNTRIES

In 2017, Turkey has realized 49% of its total polyethylene exports on amount and 51% on value basis to 10 countries.

Bulgaria, Algeria, Italy, Germany and Iran made up the top 5 polyethylene export partners of Turkey.

	1000 Tons	Million \$	% Share (Ton)	% Share (\$)
Bulgaria	2.3	2.8	10	9
Algeria	1.7	2.2	7	7
Italy	1.6	1.8	7	6
Germany	1.0	1.6	4	5
Iran	0.6	1.5	2	5
Belgium	1.2	1.5	5	5
France	0.8	1.4	3	4
Egypt	0.8	1.2	3	4
Greece	0.9	1.2	4	4
North Cyprus Turkish Rep.	0.9	1.2	4	4
10 Countries Total	11.9	16.3	49	51
Others	12.6	16.0	51	49
Total	24.5	32.4	100	100

**Table 16: Polyethylene Imports by Countries (2017)**

Source: TurkStat and ITC Trade Statistics

### 4.6. AVERAGE IMPORT AND EXPORT PRICES

Turkey's polyethylene average import price, remained above the average export price for all years. During the period 2013-2017, import prices decreased by 5.7% on

average and export prices by 4.8%. In 2017, the average import price decreased by 1.7% and the export price increased by 0.7%, compared to 2016.

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
LLDPE	1,563	1,224	1,238	-5.7	1.2
LDPE	1,887	1,764	1,598	-4.1	-9.4
HDPE	1,639	1,243	1,248	-6.6	0.4
Others	1,940	1,487	1,604	-4.6	7.9
Total	1,700	1,369	1,346	-5.7	-1.7

**Table 17: Average Import Prices of Turkey for Polyethylene by Grades (\$/Ton)**

Source: TurkStat and ITC Trade Statistics

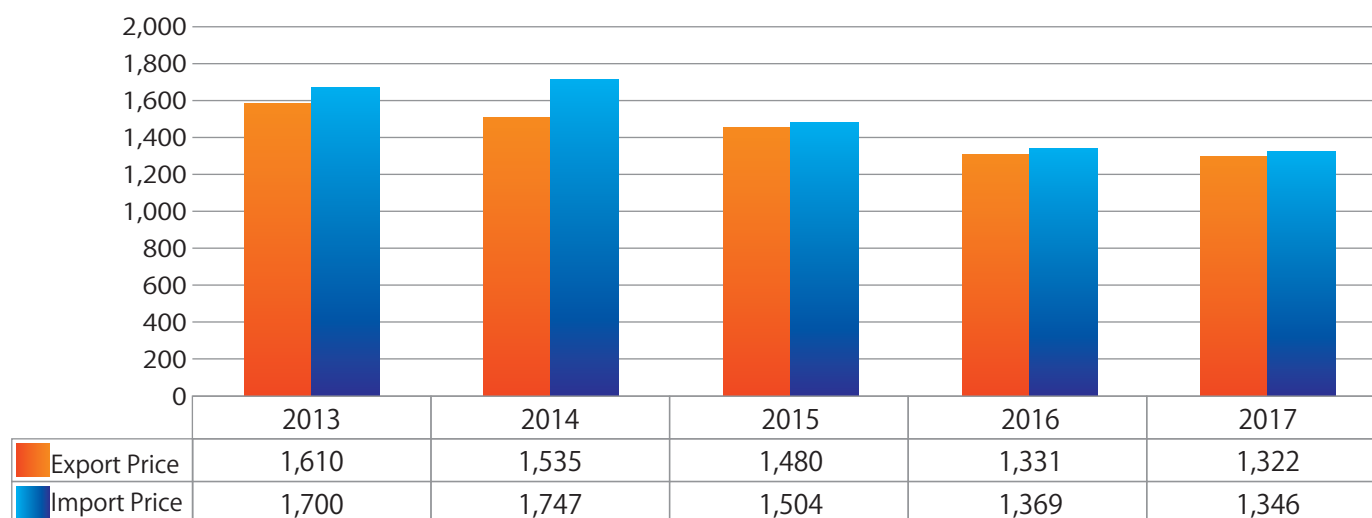


## 4. FOREIGN TRADE

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
LLDPE	1,819	1,275	1,303	-8.0	2.1
LDPE	1,666	1,538	1,298	-6.0	-15.6
HDPE	1,408	1,227	1,122	-5.5	-8.5
Others	1,536	1,731	2,016	7.0	16.5
Total	1,610	1,331	1,322	-4.8	-0.7

**Table 18: Average Export Prices of Turkey for Polyethylene by Grades (\$/Ton)**

Source: TurkStat and ITC Trade Statistics



**Graphic 9: Polyethylene Average Foreign Trade Prices(\$/kg)**

Source: TurkStat and ITC Trade Statistics

## 5. DOMESTIC CONSUMPTION

In line with the rapid development in the Turkish plastics industry, the polyethylene consumption of the industry has shown a rapid increase trend and

increased by 5% compound growth rate in the period covering 2013-2017. Consumption of 1 million 745 thousand tons in 2013, increased to 2 million 121 thousand tons in 2017.

	2013	2016	2017	CAGR % 2013-2017	% Increase (2017/2016)
LLDPE	325	353	455	8.8	29.1
LDPE	395	465	491	5.6	5.7
HDPE	848	909	977	3.6	7.5
Others	227	337	290	6.3	-13.9
Total Consumption	1,745	1,973	2,121	5.0	7.5

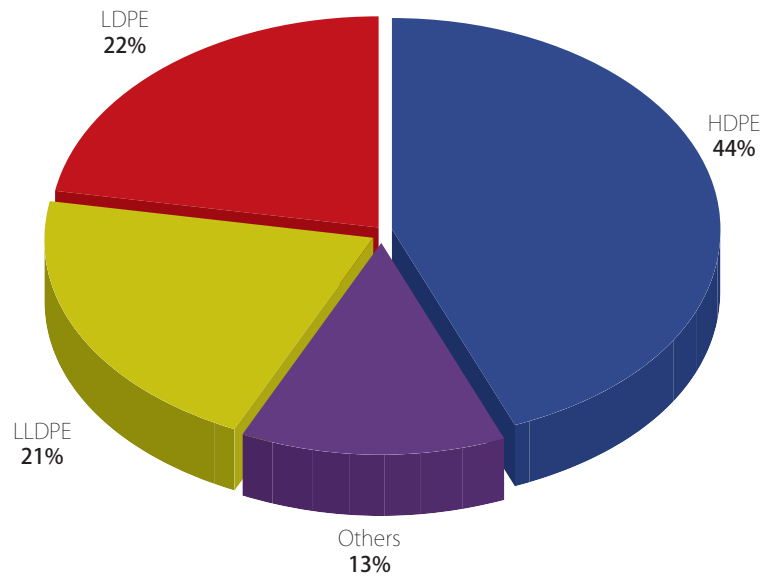
**Table19: Domestic Consumption of Polyethylene in Turkey(1000Ton)**

Source: TurkStat and ITC Trade Statistics

## 5. DOMESTIC CONSUMPTION

In 2017, HDPE shared 44%, LDPE 22%, LLDPE 21% and other polyethylene received 13% of total

polyethylene consumption.

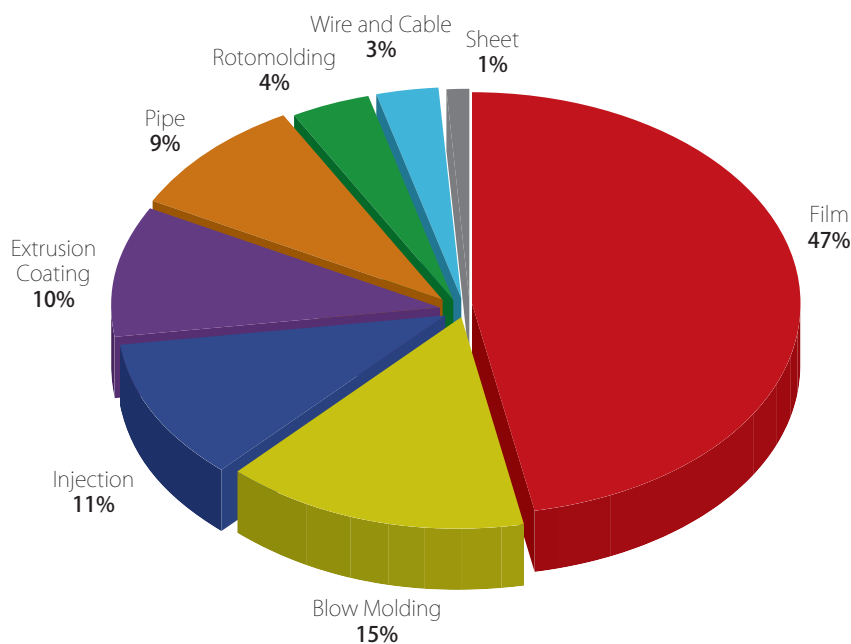


**Graphic 10: Domestic Consumption of Polyethylene by Grades in Turkey (2017)**

Source: TurkStat and ITC Trade Statistics

Total consumption of polyethylene by the main process types constitutes as; 47% film, 15% blow molding,

11% injection, 10% extrusion coating, 9% pipes, 4% rotomolding, 3% wire and cables and 1% sheet.



**Graphic 11: Total PE Consumption by Process Types**

Source: TurkStat and ITC Trade Statistics

## 6. SUPPLY AND DEMAND

It is observed that Turkey's total polyethylene production increased by 4.6% per annum, imports by 4.8%, exports by 0.9% and average annual consumption increased by 5% in the last 5 years.

Turkey's import dependency on polyethylene was 86% in 2017. It is observed that 32% of domestic production is exported in 2013, but the share of exports in production falls to 28% in 2017. The import coverage rate of polyethylene exports fell from 8% in 2013 to 6% in 2017.

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
Production	354	379	424	4.6	11.8
Imports	1,505	1,710	1,814	4.8	6.1
Exports	113	116	117	0.9	0.9
Domestic Consumption	1,745	1,973	2,121	5.0	7.5
Imports/Domestic Consumption (%)	86	87	86		
Exports/Production (%)	32	31	28		
Exports/Imports (%)	8	7	6		

**Table 20: Polyethylene Supply and Demand in Turkey (1000 Ton)**

Source: TurkStat and ITC Trade Statistics

Turkey is one of the major polyethylene importer countries of the world. The rapid growth trend in the plastics industry has also led to a rapid increase in demand for polyethylene, however, the domestic production of polyethylene is far to meet this demand.

Domestic consumption forecasts indicate that import dependency will reach to 100% in LLDPE, 61% in LDPE, 92% in HDPE and 88% in total polyethylene in 2020.



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## 1. PLASTIC RAW MATERIALS COVERED BY REPORT

The plastic raw material covered by the analysis is polymers of polypropylene (PP) and other olefins of 39.02 GTP, the

contents of which are summarized in the following table.

HS Code	Description
39.02	Polymers of propylene and other olefins (in the first form):
3902.10.00.00.00	Polypropylene (PP)
3902.20.00.00.00	Polybutylene
3902.30.00.00.00	Propylene copolymers
3902.90	Others:
3902.90.10.00.00	A-B-A block copolymer of polystyrene, ethylene-butylene copolymer and polystyrene (Containing 35% by weight or less styrene) (6 (b)
3902.90.20.00.00	Polybut-1-ene (but-1-ene with 10% or less by weight of ethylene By weight of a copolymer or polybut-1-ene containing 10% by weight or Less polypropylene (PP) and / or 25% or less by weight
3902.90.90.00.00	Polypropylene (PP) mixture) (as specified in note 6 (b) of this chapter) One) Others

**Table 1: Polymers of Polypropylene and Other Olefins HS Code of 3902 Covered by the Report**

Source: Petkim Annual Reports

## 2. INSTALLED CAPACITY

The only plant producing polypropylene in Turkey is Petkim and its current production capacity is capable of

producing 144,000 tons of polypropylene per year.

Date of Operation	1985
Initial Capacity	60,000 Ton/Year
Extension Dates	1993, 2005
After-Capacity	144,000 Ton/Year
Products	PP Fiber (EH-251, EH-241, EH-341, EH-102) Filler (MH-418, MH-220, MH-180) Pipe BC050 Film (FH-250, FH-360 , Molding (MH-220N )

**Table 2: Petkim Production Capacity of Polypropylene Products**

Source: Petkim Annual Reports

Petkim started production of polypropylene in 1985 with a capacity of 60,000 tons and increased its production capacity to 144,000 tons with the investments realized in 1993 and 2005. The main uses of polypropylene produced

by the company are; cloth, sack, carpet yarn, rope, table cloth, mop, filter cloth, felt, cord cloth, pipe, cable sheath, fish net, brush, basin, table, chair, toy, picnic products.

### 3. PRODUCTION AND CAPACITY UTILIZATION

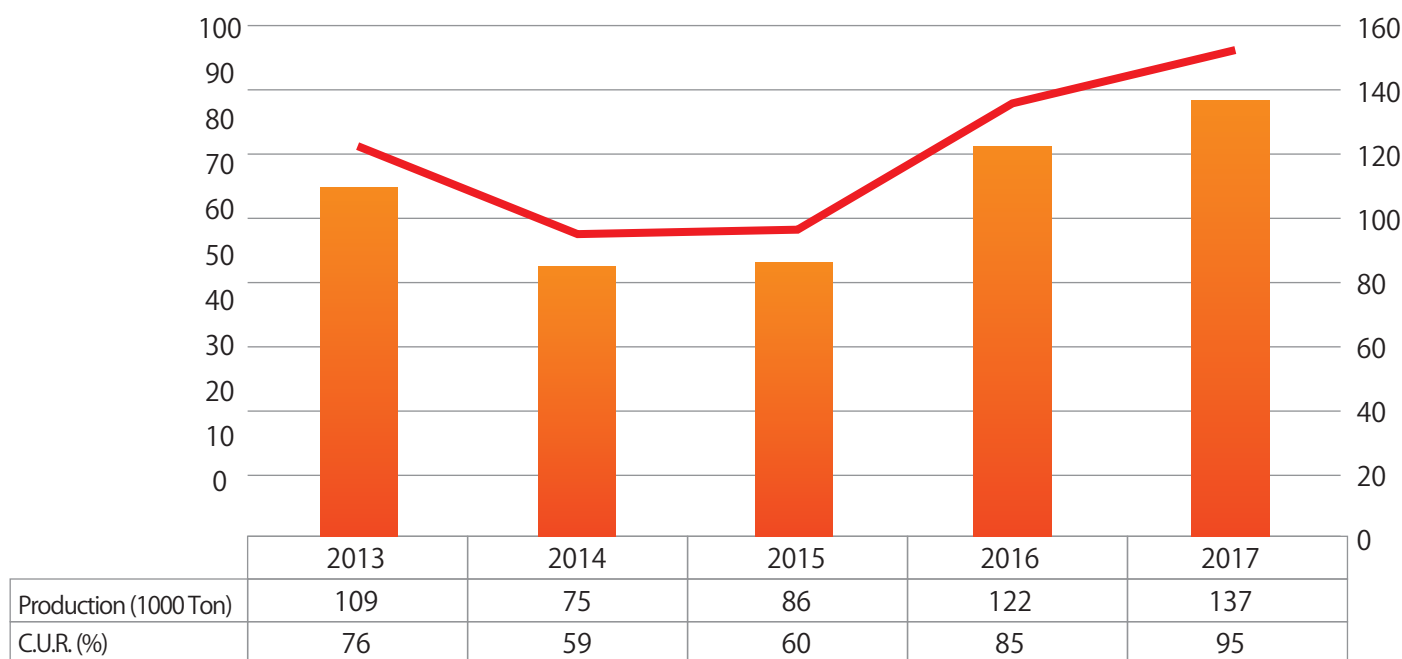
The production of polypropylene produced by Petkim between 2013-2017 period has been given in the table

and graphic below. The production of Petkim realized as 137 thousand tons and capacity utilization rate as 95% in 2017.

	Production 1000 Ton	C.U.R. %
2013	109	76
2014	85	59
2015	86	60
2016	122	85
2017	137	95

**Table 3: Petkim Polypropylene Production and Capacity Utilization**

Source: Petkim Annual Reports



**Graphic 1: Petkim Polypropylene Production and Capacity Utilization**

Source: Petkim Annual Reports

### 4. FOREIGN TRADE

#### 4.1. IMPORTS

While total polypropylene imports, realized in 2013-2017 period, decreased by 7.9% per year on amount basis, increased by 11.5% per annum on value basis, reaching to

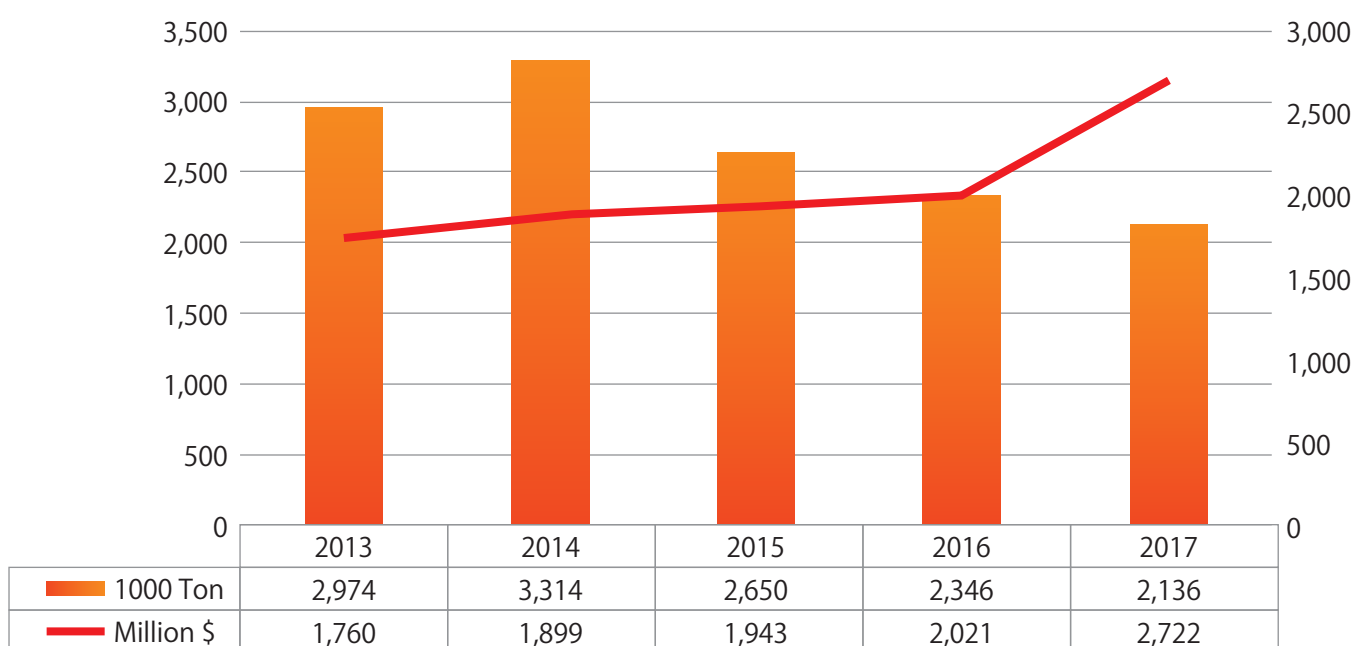
2 million 136 thousand tons and 2 billion 772 million dollars in 2017. Imports of polypropylene decreased by 8.9% on amount and 34.7% in terms of value in 2017 compared to 2016.

## 4. FOREIGN TRADE

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
1000 Ton	2,974	2,346	2,136	-7.9	-8.9
Million \$	1,760	2,021	2,722	11.5	34.7

**Table 4: Polypropylene Imports of Turkey**

Source: TurkStat and ITC Trade Statistics



**Graphic 2: Polypropylene Imports of Turkey**

Source: TurkStat and ITC Trade Statistics

In Turkey, imports of polypropylene in primary forms accounted for 81% on amount and 78% on volume basis of total imports in 2017. On the other hand, the primary

forms of polypropylene copolymers accounted for 19% of the total imports on amount and 22% on value basis.

	Amount Basis		Value Basis	
	2013	2017	2013	2017
Polypropylene (Primary Form)	76.0	80.6	77.7	77.8
Propylene copolymers (Primary Form)	0.3	0.2	0.2	0.3
Others	23.7	19.3	22.1	21.9
Total	100.0	100.0	100.0	100.0

**Table 5: Polypropylene Imports of Turkey by Grades (2017- %)**

Source: TurkStat and ITC Trade Statistics



## 4. FOREIGN TRADE

### 4.2. EXPORTS

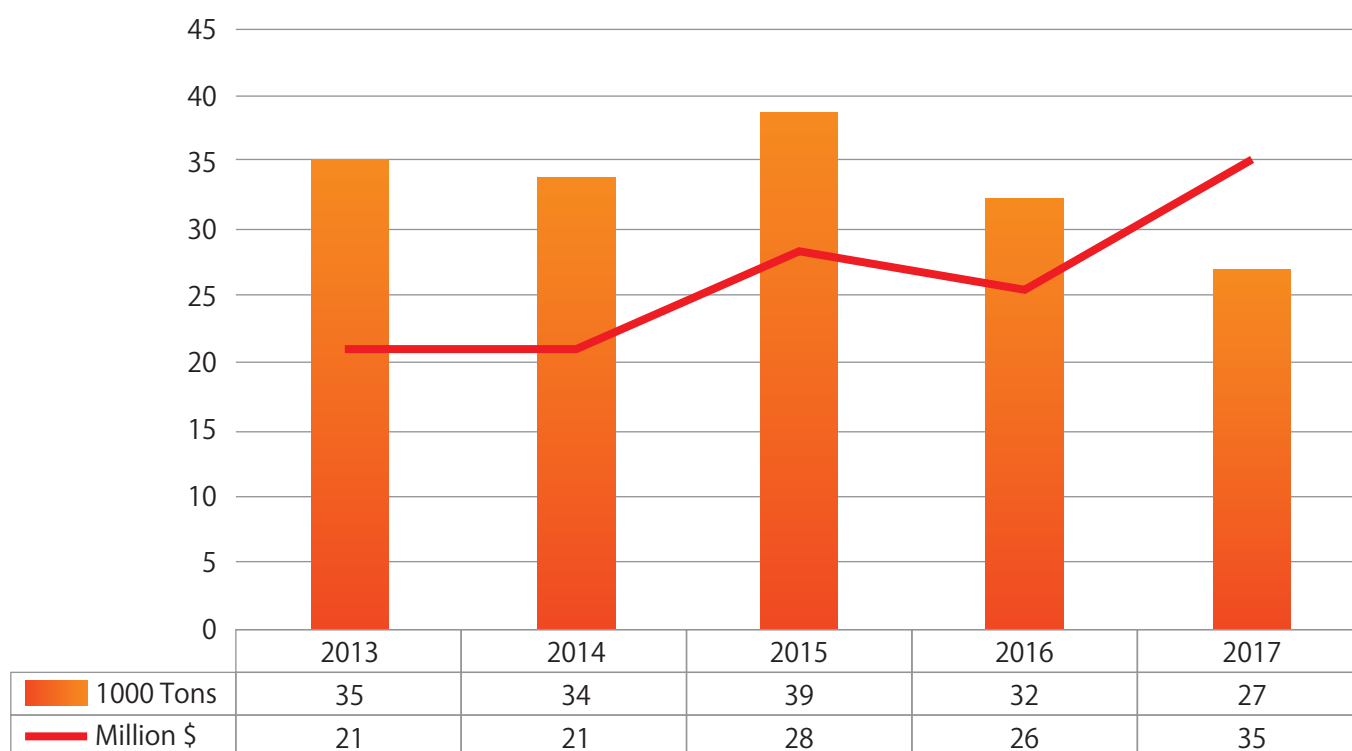
Total polypropylene exports, realized as 27 thousand tons and 35 million dollars in 2017, decreasing by 6.7% per annum on amount and increasing by 13.7% on

a value basis for the last 5 years covering 2013-2017 period. Exports decreased by 17% on amount and 36.6% on value basis in 2017 compared to 2016.

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
1000 Tons	35	32	27	-6.7	-17.0
Million \$	21	26	35	13.7	36.6

**Table 6: Polypropylene Exports of Turkey**

Source: TurkStat and ITC Trade Statistics



**Graphic 3: Polypropylene Exports of Turkey**

Source: TurkStat and ITC Trade Statistics

In Turkey, polypropylene in primary forms accounted for 71% on amount and 66% on volume basis of total exports in 2017.

On the other hand, the primary forms of polypropylene copolymers accounted for 29% of the total exports on amount and 34% on value basis.

## 4. FOREIGN TRADE

	Amount Basis		Value Basis	
	2013	2017	2013	2017
Polypropylene (Primary Form)	70.6	71.3	74.5	65.5
Propylene copolymers (Primary Form)	0.6	0.2	0.3	0.3
Others	28.8	28.5	25.2	34.2
Total	100.0	100.0	100.0	100.0

**Table 7: Polypropylene Exports of Turkey by Grades (2017- %)**

Source: TurkStat and ITC Trade Statistics

### 4.3. FOREIGN TRADE DEFICIT

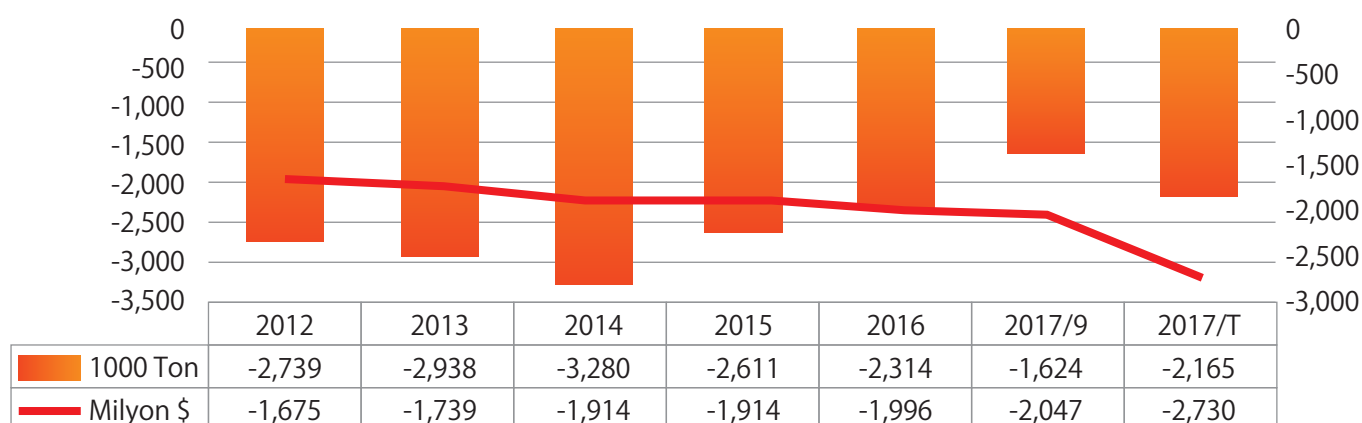
Polypropylene foreign trade always gives a large deficit in terms of both quantity and value in Turkey. The polypropylene trade deficit has increased by 11.5% per annum on amount and 1.4% on value basis in the period

of 2013-2017 and realized as 2.11 million tons and 2.69 billion dollars in 2017. Foreign trade deficit decreased by 8.8% on amount and 34.7% on value basis in 2017 compared to 2016.

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
1000 Tons	-2,938	-2,314	-2,109	11.5	-8.8
Million \$	-1,739	-1,996	-2,687	1.4	34.7

**Table 8: Foreign Trade Deficit of Turkey**

Source: TurkStat and ITC Trade Statistics



**Graphic 4: Foreign Trade Deficit**

Source: TurkStat and ITC Trade Statistics

### 4.4. IMPORTS BY COUNTRIES

In 2017, Turkey has realized 81% of total polypropylene imports in terms of amount and 80% in value terms from

10 countries. S. Arabia, S. Korea, Egypt, Israel and Belgium have made the top 5 import partners of Turkey.

## 4. FOREIGN TRADE

Countries	1000 Ton	Million \$	% -Ton	% -\$
S. Arabia	623	724	29	27
S.Korea	222	290	10	11
Egypt	221	270	10	10
Israel	121	157	6	6
Belgium	105	156	5	6
Iran	114	136	5	5
Spain	83	128	4	5
India	105	121	5	4
Germany	62	96	3	4
Greece	71	86	3	3
10 Total	<b>1,727</b>	<b>2,164</b>	<b>81</b>	<b>80</b>
Others	<b>409</b>	<b>558</b>	<b>19</b>	<b>20</b>
Total	<b>2,136</b>	<b>2,722</b>	<b>100</b>	<b>100</b>

**Table 9: Polypropylene Imports of Turkey by Countries - 2017**

Source: TurkStat and ITC Trade Statistics

### 4.5. EXPORTS BY COUNTRIES

In 2017, 65% of total polypropylene exports on amount and 69% in value terms destined to 10 countries.

Bursa Free Trade Zone, Egypt, Çorlu Free Trade Zone, Iran and Hungary have made the top 5 export partners of Turkey.

Countries	1000 Ton	Million \$	% -Ton	% -\$
Bursa Ser. Bölgesi	6.6	8.3	25	24
Mısır	2.4	3.3	9	10
Çorlu Avr. Ser. Bölgesi	1.5	2.1	5	6
Iran	1.0	2.0	4	6
Hungary	1.2	1.9	5	5
Iraq	1.4	1.8	5	5
China	1.2	1.5	5	4
Germany	0.6	1.2	2	4
Azerbaijan	0.7	1.1	3	3
Romania	0.7	0.9	3	3
10 Countries Total	<b>17.3</b>	<b>24.1</b>	<b>65</b>	<b>69</b>
Others	<b>9.5</b>	<b>10.8</b>	<b>35</b>	<b>31</b>
Total	<b>26.9</b>	<b>34.9</b>	<b>100</b>	<b>100</b>

**Table 10: Polypropylene Export of Turkey by Countries - 2017**

Source: TurkStat and ITC Trade Statistics

## 4. FOREIGN TRADE

### 4.6. IMPORT AND EXPORT PRICES

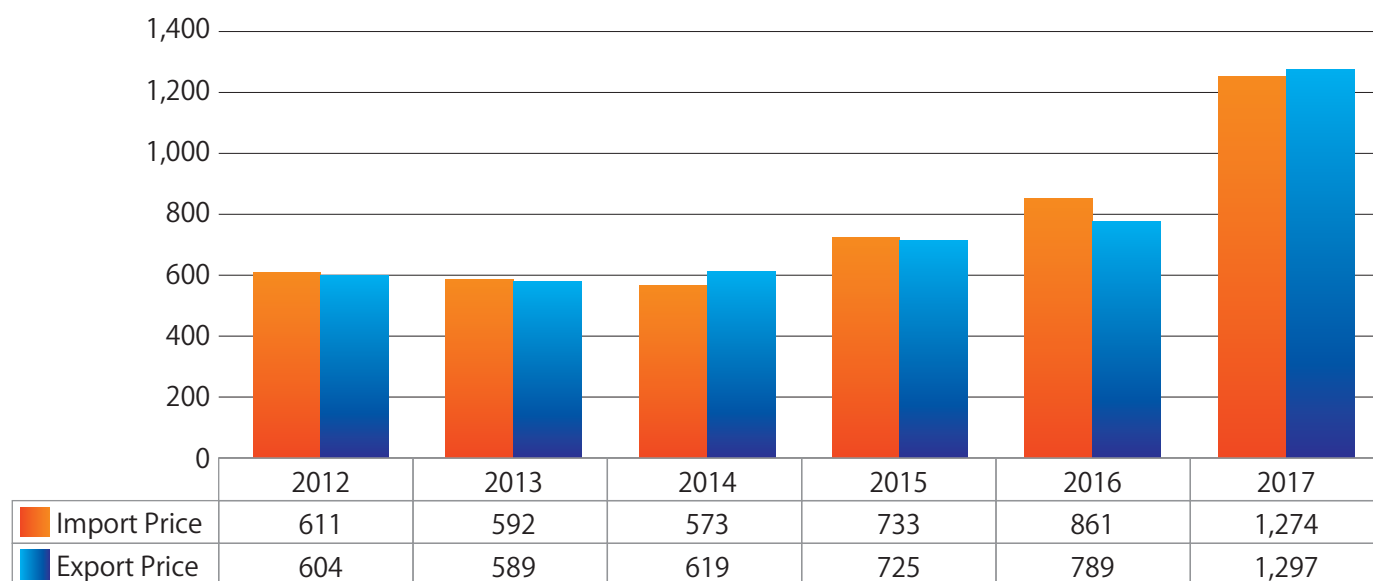
Between 2013 and 2017, the average import prices of polypropylene have increased by an average of 21.1% and export prices by 21.8%. In 2017, the average

import price realized as 1.274 \$/ton and export price as 1.297 \$/ton and import price increased by 47.9% and export price 64.5% compare to 2016.

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
Import Price	592	861	1,274	21.1	47.9
Export Price	589	789	1,297	21.8	64.5

**Table 11: Average Foreign Trade Prices of Polypropylene in Turkey (\$/ton)**

Source: TurkStat and ITC Trade Statistics



**Graphic 5: Average Foreign Trade Prices of Polypropylene in Turkey (\$/ton)**

Source: TUIK



## 5. DOMESTIC CONSUMPTION BY INDUSTRIES

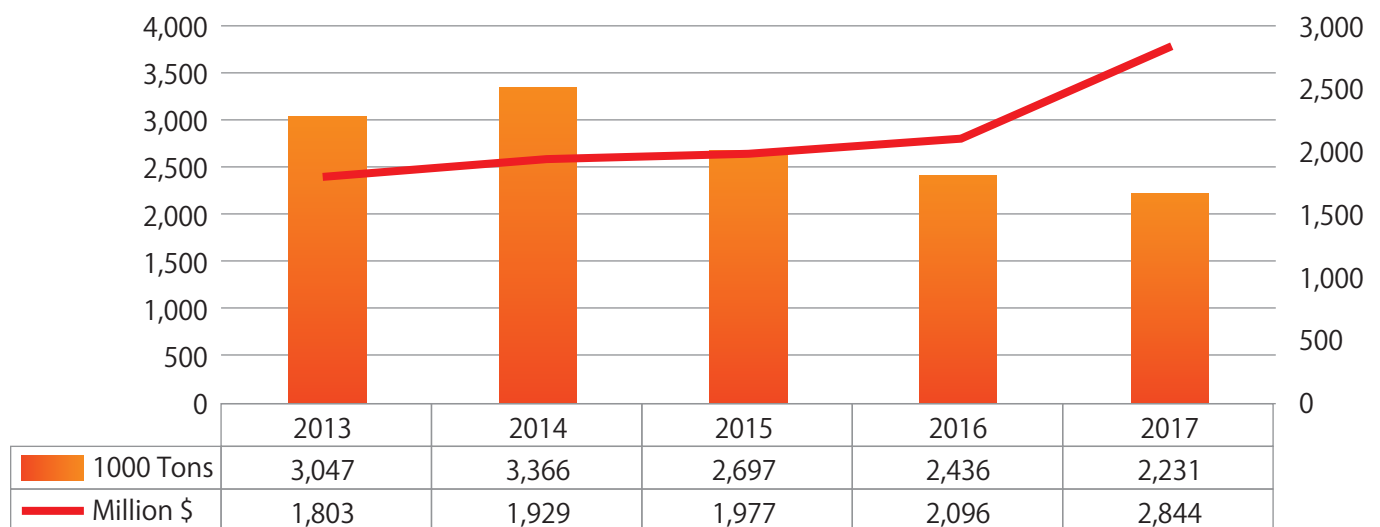
The polypropylene domestic consumption has decreased by an average of 7.5% per annum on amount and increased by 12.1% in the period covering 2013-2017 and realized as 2.23 million tons and 2.84 billion dollars in 2017.

Domestic consumption decreased by 8.4% on amount and increased by 35.7% on value basis in 2017 compared to 2016.

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
1000 Tons	3,047	2,436	2,231	-7.5	-8.4
Million \$	1,803	2,096	2,844	12.1	35.7

**Table 12: Domestic Consumption of Polypropylene**

Source: TurkStat and ITC Trade Statistics



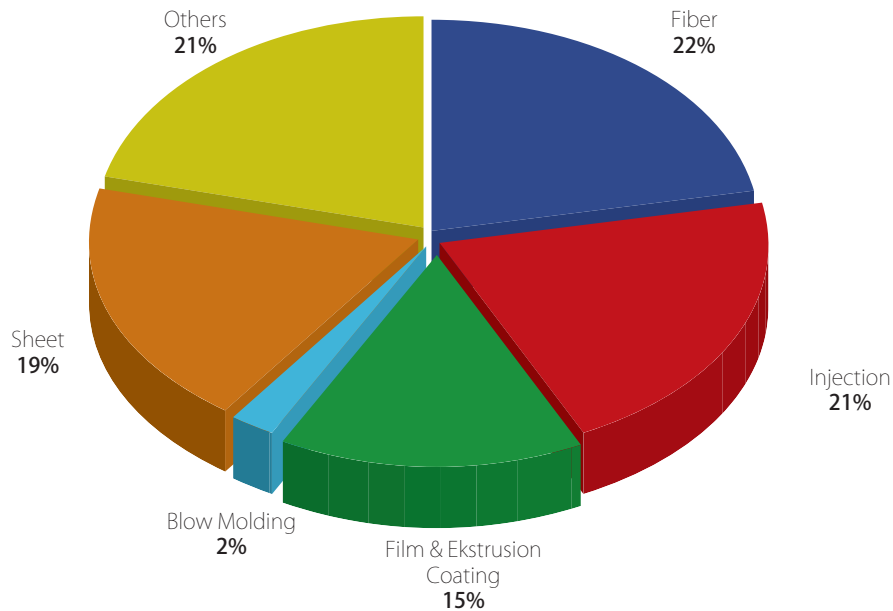
**Graphic 6: Domestic Consumption of Polypropylene in Turkey**

Source: TurkStat and ITC Trade Statistics

In Turkey, fiber accounts for 22% and injection for 21% of total polypropylene consumption according to process types. The sheets constitutes the third major process type with 19% and the film and extrusion

coating with 15%. Blow molding is 2% of total consumption. The total share of all process types other than these is 21%.

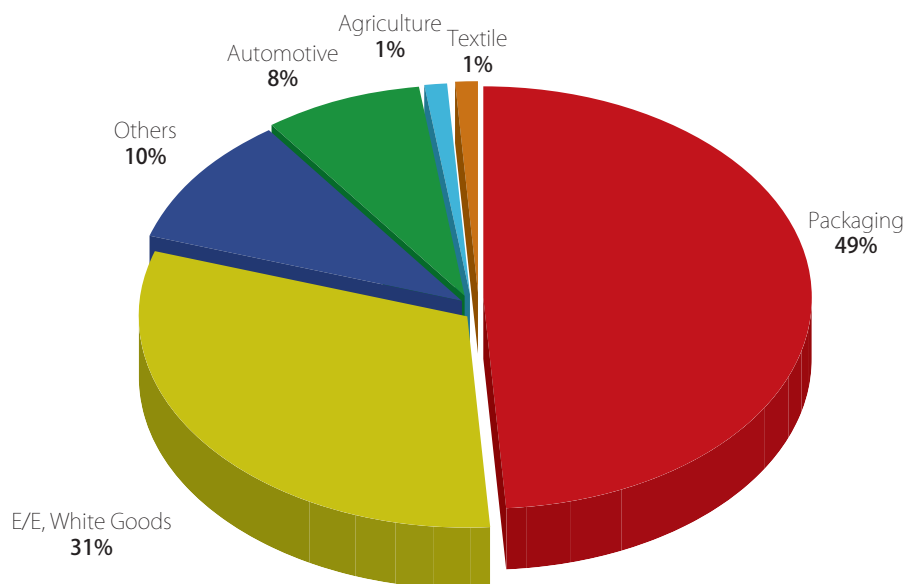
## 5. DOMESTIC CONSUMPTION BY INDUSTRIES



Graphic 7: Polypropylene Consumption by Process Types

In Turkey, 49% of total polypropylene consumption in 2017 constituted packaging, 31% in electricity, electronics and

white goods, and 8% in automotive sectors. Agriculture and textile sectors accounted for 1% of total consumption.



Graphic 8: Polypropylene Consumption by Subsectors (%)

## 6. SUPPLY AND DEMAND

In the last 5 years period of 2013-2017, total polypropylene production increased by 5.7% per annum. On the other hand, imports decreased by 7.9% exports by 6.7% and domestic consumption by 7.5%, respectively.

In 2017, 96% of domestic demand was met by imports and 20% of domestic production is exported and the import coverage ratio of exports realized as 1.3%. It is estimated that, polypropylene production to be 137 thousand tons, imports 2.24 million tons, exports 25 thousand tons domestic consumption 2.36 million tons in 2017. In this period, 95.3% of domestic consumption will be met by imports.

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016	2018/E
Production	109	122	137	5.7	11.8	137
Imports	2,974	2,346	2,136	-7.9	-8.9	2,243
Exports	35	32	27	-6.7	-17.0	25
Domestic Consumption	3,047	2,436	2,231	-7.5	-8.4	2,355
Imports/Domestic Consumption (%)	97.6	96.3	95.7			95.3
Exports/Production (%)	32.4	26.4	19.6			18.3
Export/Imports (%)	1.2	1.4	1.3			1.1

**Table 13: Supply and Demand for Polypropylene in Turkey (1000Ton)**

Source: TurkStat and ITC Trade Statistics

Turkey is one of the major importers of polypropylene in the world. However, domestic production fails to meet the increasing demand. From this point of view, Turkey seems to

have an important polypropylene market for existing or possible petrochemical plants for polypropylene production.



**PAGEV**



**TURKISH PS – POLYSTYRENE**  
FOLLOW-UP REPORT  
**2017**



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## 1. PLASTIC RAW MATERIALS COVERED BY REPORT

The plastic raw material covered by the analysis is Polystyrene HS Code 39.03

In the analysis, foreign trade data is taken as 39.03 HS

HS Code	Definition
39.03	Styrene polymers (in the first form):
	Polystyrene:
3903.11.00.00.00	expandable
3903.19.00.00.00	Others
3903.20.00.00.00	Styrene-acrylonitrile (SAN) copolymers
3903.30.00.00.00	Acrylonitrile-butadiene-styrene (ABS) copolymers
3903.90	Others:
3903.90.10.00.00	Only the styrene and allyl alcohol copolymer (acetyl value 175 or more)
3903.90.20.00.00	The brominated polystyrene (58% by weight or more but not 71% by weight containing bromine, in one of the Figures given in Note 6 (b) of this chapter,
3903.90.90.00.00	Others

**Table 1: Styrene Polymers by Hs Code Covered by the Report**

Source: TurkStat and ITC Trade Statistics

## 2. INSTALLED CAPACITY

Turkey has 170 MT/year of EPS, 20 MT/year of HIPPS and 20 MT/year of GPPS production capacity. Ravago has EPS production with an annual capacity of 150 MT/year

and Aschem has 20 MT/year of EPS, 20 MT/year of GPPS and 20 MT/year of HIPS in Turkey. Total installed capacity of PS accounts for 210 MT/year.

	RAVAGO	ASCHEM	Total
EPS	150	20	170
HIPS		20	20
GPPS		20	20
Total	150	60	210

**Table 2: Installed Capacity of Polystyrene in Turkey**

Source: Manufacturing Companies

### 3. PRODUCTION

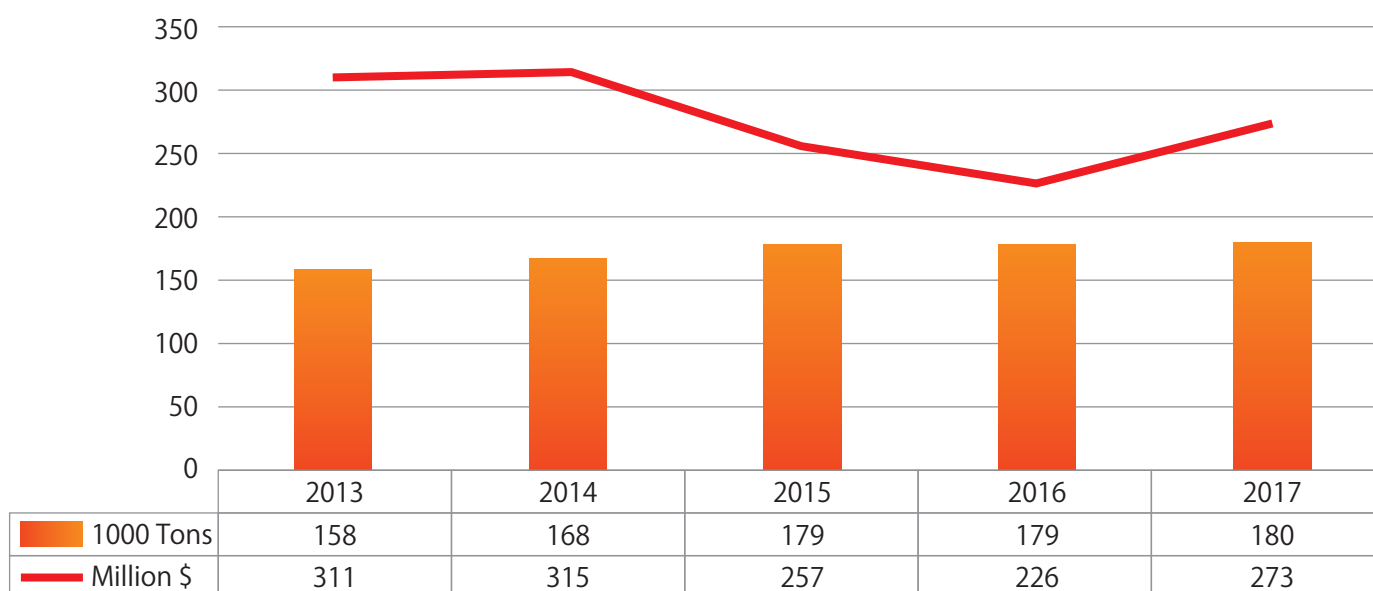
As the demand for polystyrene is increasing, domestic production continues its growth. Having been 158 thousand tons and 311 million dollars in 2013, the production reached up to 180 thousand tons and

273 million dollars in 2017 with an annual increasing rate of 3.3% on amount and decreasing rate of 3.2% for the last 5 years. Production increased by 0.6% on amount and 20.9% on value basis in 2017 compared to 2016.

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
1000 Tons	158	179	180	3.3	0.6
Million \$	311	226	273	-3.2	20.9

**Table 3: Polystyrene Production in Turkey**

Source: Manufacturing Companies



**Graphic 1: Polystyrene Production in Turkey**

Source: Manufacturing Companies

### 4. FOREIGN TRADE

#### 4.1. IMPORTS

As domestic polystyrene production is far from meeting the demand of the growing domestic market, Turkey imports polystyrene to a large extent. However, in recent years there has been a decline in imports parallel to the increase in domestic production.

Imports of 506 thousand tons and 1 billion 75 million dollars in 2013 realized as 535 thousand tons and 881 million dollars in 2017 in the last 5 years with an annual increasing rate of 1.4% on amount and decreasing rate of 4.9% on value basis.

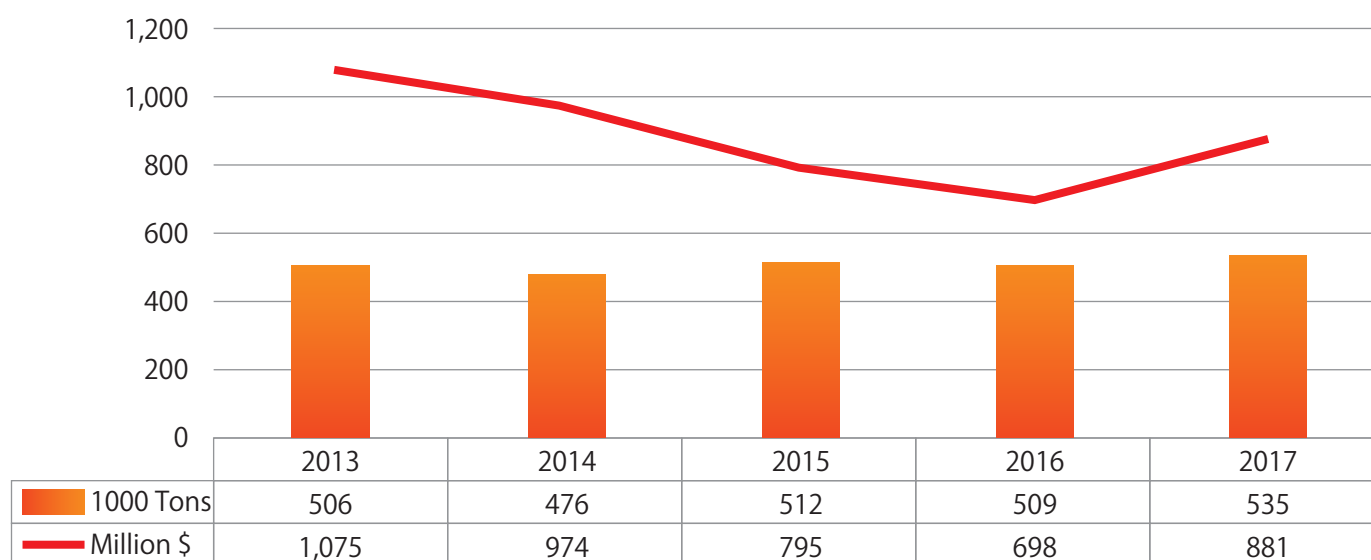
In 2017, the imports of polystyrene increased by 5.1% on amount and by 26.1% on value basis in 2017 compared to 2016.

## 4. FOREIGN TRADE

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
1000 Tons	506	509	535	1.4	5.1
Million \$	1,075	698	881	-4.9	26.1

**Table 4: Polystyrene Imports of Turkey**

Source: TurkStat and ITC Trade Statistics



**Graphic 2: Polystyrene Imports of Turkey**

Source: TurkStat and ITC Trade Statistics

In 2017, 17% of Turkey's imports were expanded polystyrene (EPS) on amount and value basis.

Other polystyrene imports shared 47% on amount and 42% on value basis.

HS Code	Definition	Amount Basis (%)	Value Basis (%)
390311	Expandable Polystyrene (EPS) (Primary Form )	17	17
390319	Other Polystyrene's (excluding EPS)	47	42
390320	Styrene-acrylonitrile (SAN) copolymers	2	2
390330	Acrylonitrile-butadiene-styrene (ABS) copolymers	25	29
390390	Other polystyrenes (Primary Form )	10	10
	Total	100	100

**Table 5: Polystyrene Imports by HS Codes in Turkey(2017)**

Source: TurkStat and ITC Trade Statistics

## 4. FOREIGN TRADE

### 4.2. EXPORTS

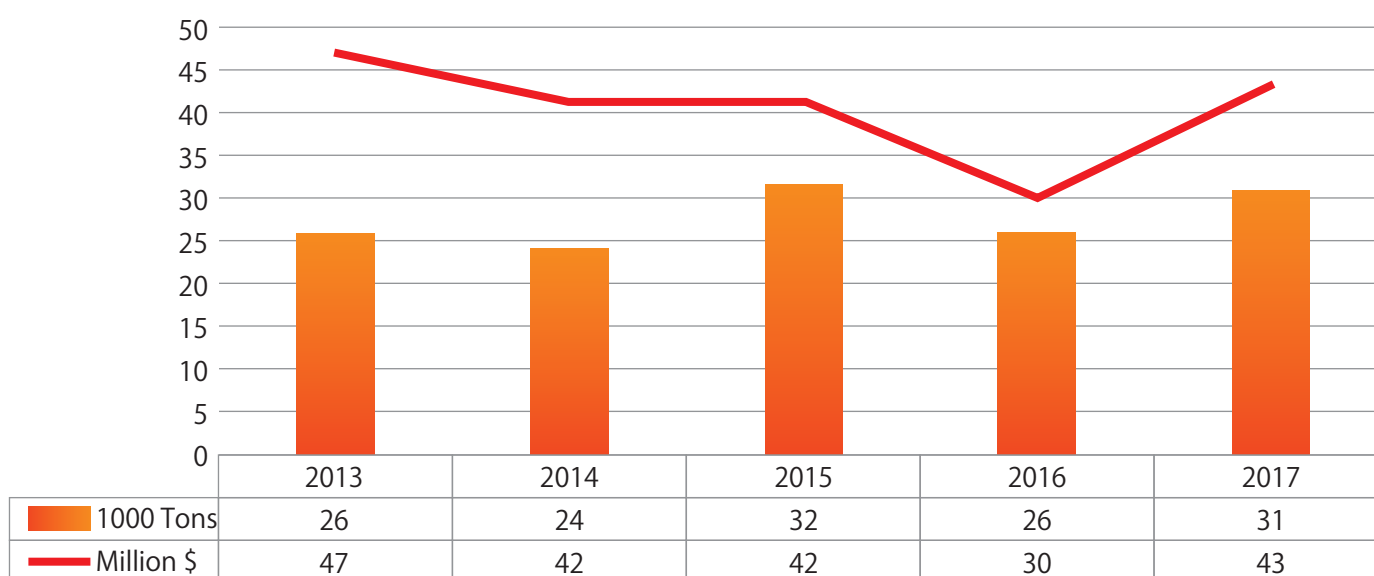
Exports of 26 thousand tons and 47 million dollars in 2013 increased by 4.6% per year on amount and decreased by 2.2% on value basis respectively for the

last 5 years and reached to 31 thousand tons and 43 million dollars in 2017. Exports of polystyrene increased by 18.6% on amount and 42.8% on value basis in 2017 compared to 2016.

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
1000 Tons	26	26	31	4.6	18.2
Million \$	47	30	43	-2.2	42.8

**Table 6: Polystyrene Exports of Turkey**

Source: TurkStat and ITC Trade Statistics



**Graphic 3: Polystyrene Exports of Turkey**

Source: TurkStat and ITC Trade Statistics

In 2017, share of EPS in polystyrene exports realized as 63% on amount and 71% on value basis. Other polystyrene

imports shared 29% on amount and 20% on value basis.

HS Code		Amount Basis (%)	Value Basis (%)
390311	Expandable Polystyrene (EPS) (Primary Form )	63	71
390319	Other Polystyrene's (excluding EPS)	4	4
390320	Styrene-acrylonitrile (SAN) copolymers	0	0
390330	Acrylonitrile-butadiene-styrene (ABS) copolymers	3	5
390390	Other polystyrenes (Primary Form )	29	20
	Total	100	100

**Table 7: Polystyrene Exports of Turkey by HS Codes (2017)**

Source: TurkStat and ITC Trade Statistics

## 4. FOREIGN TRADE

### 4.3. FOREIGN TRADE DEFICIT

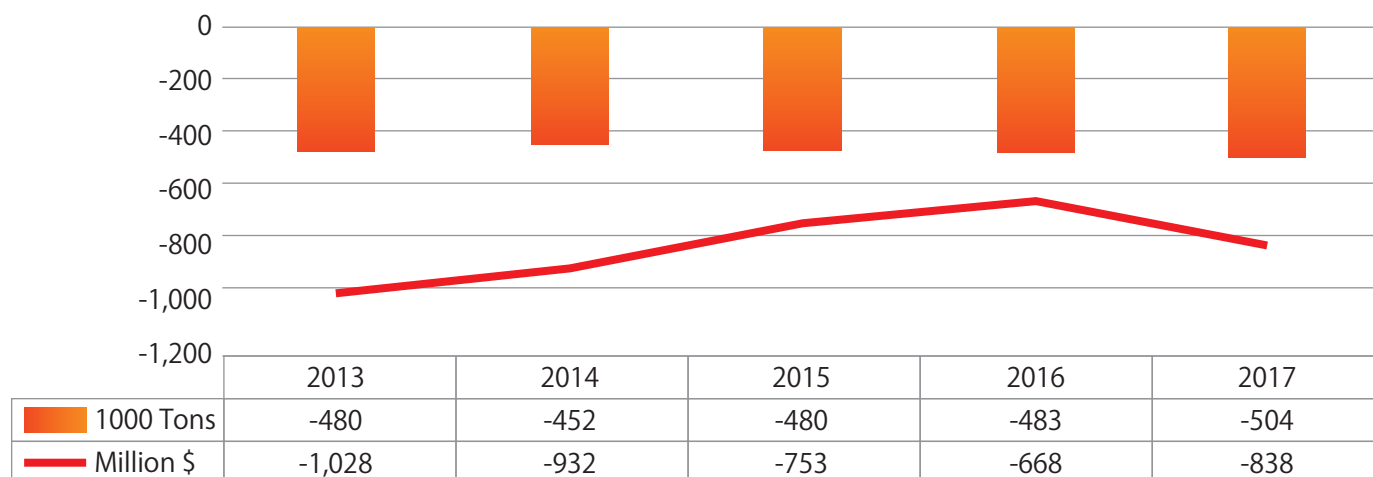
Turkey, always gives deficit in polystyrene foreign trade both on the basis amount and value. Having been 480 thousand tons and 1 billion 28 million dollars in 2013, foreign trade deficit of polystyrene reached up to

504 thousand tons and 838 million dollars in 2017 with an increasing rate of 1.2% on amount and decreasing rate of 5% on value basis for the last 5 years. Foreign trade deficit increased by 4.3% on amount and 25.4% on value basis in 2017 compared to 2016.

	2013	2014	2015	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
1000 Tons	-480	-452	-480	-483	-504	1.2	4.3
Million \$	-1,028	-932	-753	-668	-838	-5.0	25.4

**Table 8: Polystyrene Foreign Trade Deficit of Turkey**

Source: TurkStat and ITC Trade Statistics



**Graphic 4: Polystyrene Foreign Trade Deficit of Turkey**

Source: TurkStat and ITC Trade Statistics

### 4.4. IMPORTS BY COUNTRIES

Turkey imported 88% of total polystyrene imports on amount and 86% on value basis from 10 countries in 2017.

South Korea, Belgium, Yumurtalik Free Trade Zone, Iran and France were the main import partners of Turkey.

## 4. FOREIGN TRADE

Ülke	1000 Tons	Million \$	% -Ton	% -\$
Korea	115	211	22	24
Belgium	114	180	21	20
Yumurtalık Free Trade Zone	67	97	13	11
Iran	50	68	9	8
France	26	43	5	5
Germany	24	40	4	5
Taiwan	24	39	4	4
Austria	16	29	3	3
Netherlands	12	24	2	3
S.Arabia	17	24	3	3
10 Countries Total	<b>463</b>	<b>756</b>	<b>87</b>	<b>86</b>
Others	<b>71</b>	<b>125</b>	<b>13</b>	<b>14</b>
Total	<b>535</b>	<b>881</b>	<b>100</b>	<b>100</b>

**Table 9: Polystyrene Imports of Turkey by Countries (2017)**

Source: TurkStat and ITC Trade Statistics

### 4.5. EXPORTS BY COUNTRIES

In 2017, 62% of Turkey's total polystyrene exports on amount and 63% of on value basis destined to 10 countries.

In the mentioned period, Romania, Saudi Arabia, Israel, UAE and Egypt formed the top 5 countries that Turkey exports most polystyrene.

Countries	1000 Tons	Million \$	% -Ton	% -\$
Romania	3.3	5.5	11	13
S.Arabia	2.8	3.5	9	8
Israel	2.7	3.5	9	8
UAE	2.1	2.8	7	7
Egypt	2.7	2.7	9	6
Serbia	1.5	2.5	5	6
Bulgaria	1.1	1.8	3	4
Georgia	1.1	1.8	3	4
Kayseri Free Trade Zone	0.9	1.6	3	4
Morocco	1.0	1.6	3	4
10 Countries Total	19.1	27.3	62	63
Other	11.9	15.8	38	37
Total	31.0	43.1	100	100

**Table 10: Polystyrene Exports of Turkey by Countries (2017)**

Source: TurkStat and ITC Trade Statistics

## 4. FOREIGN TRADE

### 4.6. IMPORT AND EXPORT PRICES

Turkey's average import prices of polystyrene have been higher than average export prices in all years. In the last 5

5 years, import prices have declined by 6.1% on average, and export prices by 6.5%.

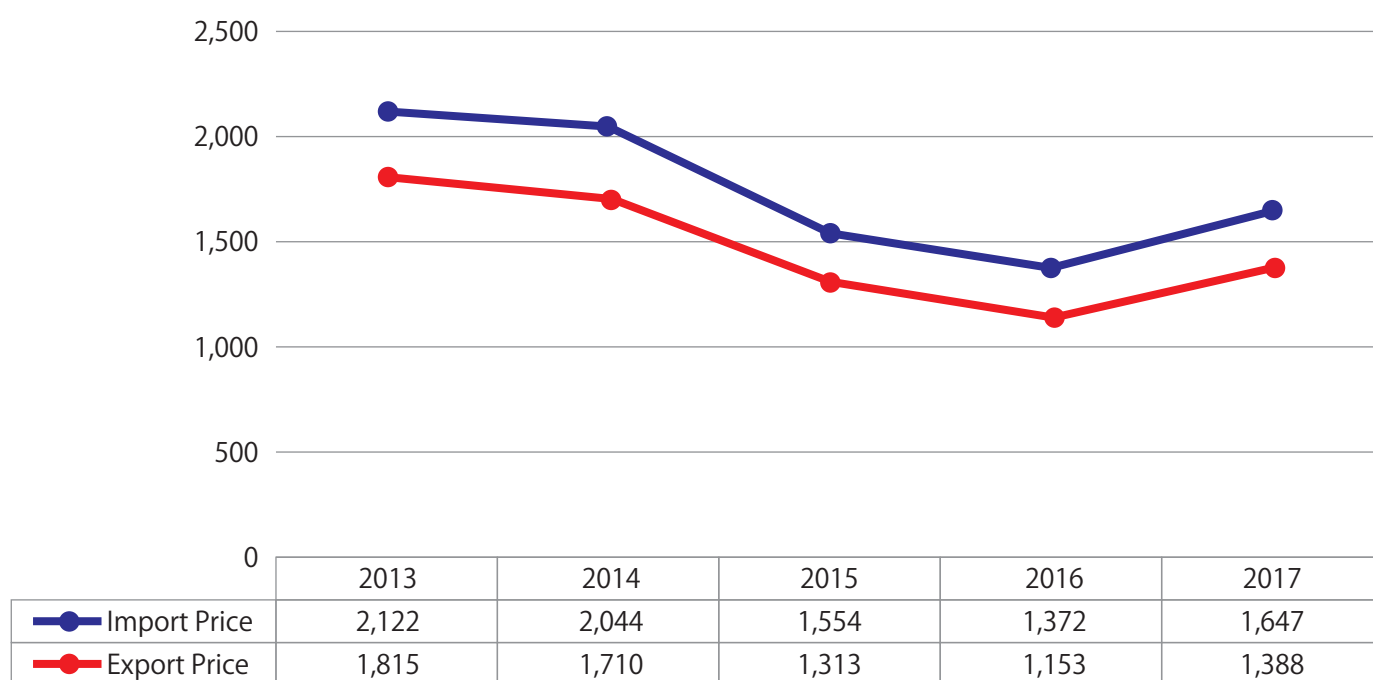
	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
Import Price	2,122	1,372	1,647	-6.1	20.0
Export Price	1,815	1,153	1,388	-6.5	20.4

**Table 11: Polystyrene Average Foreign Trade Prices of Turkey (\$/kg)**

Source: TurkStat and ITC Trade Statistics

In 2017, import price increased by 20% and export price 20.4% compared to 2016 and the average import price of

polystyrene was 19% above the average export price.



**Graphic 5: Polystyrene Average Foreign Trade Prices of Turkey (\$/kg)**

Source: TurkStat and ITC Trade Statistics



## 5. DOMESTIC CONSUMPTION

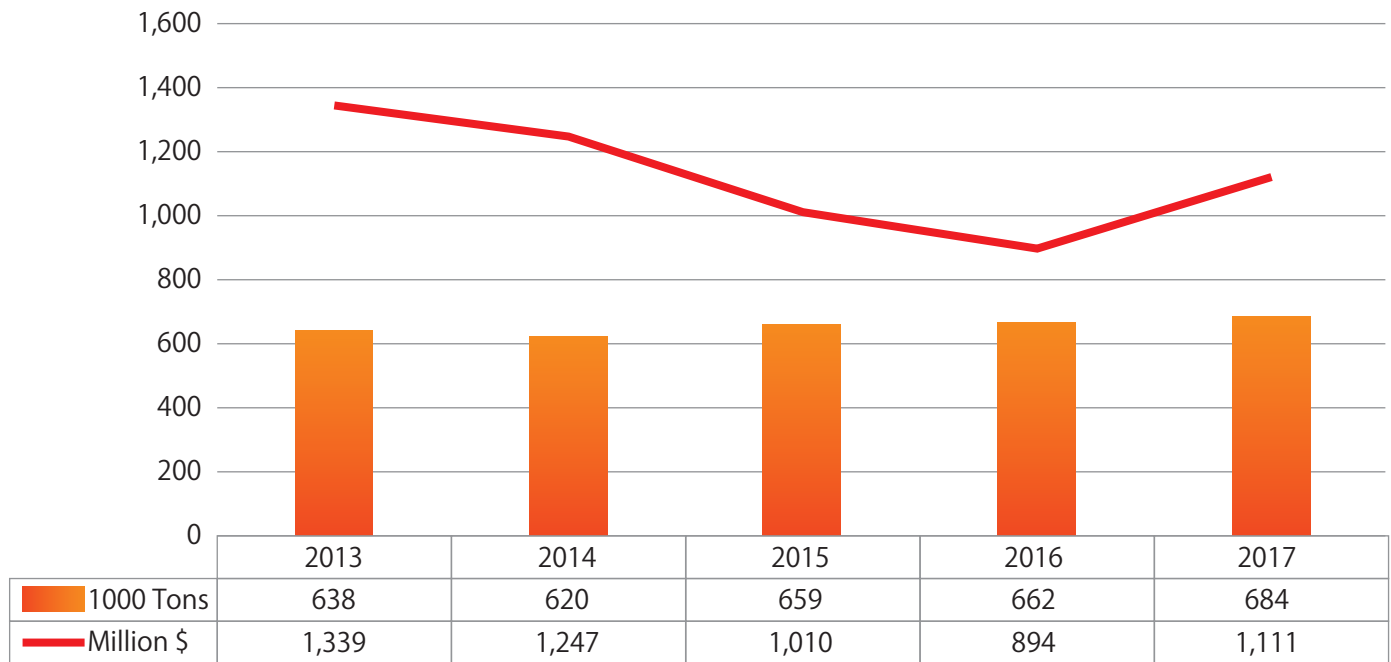
In parallel with the rapid developments in the Turkish plastics industry, the consumption of polystyrene in the industry has also shown an upward trend and has increased with a compound growth rate of 1.7% on amount in the period covering 2013-2017.

Consumption declined by an average of 4.6% per annum on value basis due to the decline in average selling prices. Consumption reached up to 684 thousand tons and 1 billion 111 million dollars in 2017. Consumption increased by 3.3 on amount and 24.2% on value basis in 2017 compared to 2016.

	2013	2016	2017	CAGR % 2013-2017	% Artış (2017/2016)
1000 Ton	638	662	684	1,7	3,3
Milyon \$	1.339	894	1.111	-4,6	24,2

**Tablo 12: Türkiye'nin Polistiren İç Pazar Tüketimi**

Kaynak: TÜİK ve İTC Dış Ticaret İstatistikleri



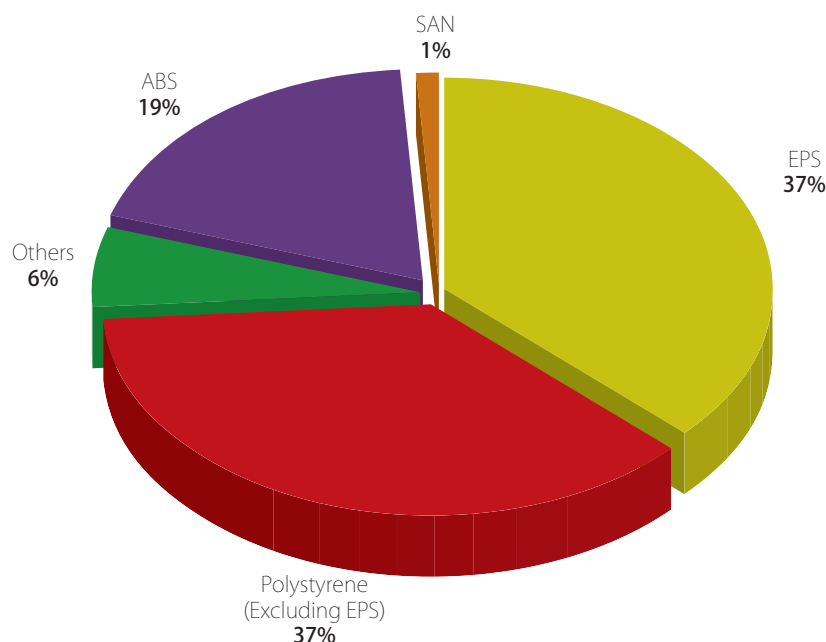
**Graphic 6: Turkey's Polystyrene Domestic Consumption**

Source: TurkStat and ITC Trade Statistics

In the 9 months of 2017, EPS accounted for 37% of Turkey's domestic market consumption and other shared 37% of total.

The share of ABS in total consumption is 19%. The share of the others was 1% and 6% respectively.

## 5. DOMESTIC CONSUMPTION



**Graphic 7: Turkey's Polystyrene Domestic Consumption by Types (2017)**

Source: TurkStat and ITC Trade Statistics

## 6. MAIN APPLICATION AREAS FOR POLYSTYRENE IN TURKEY

### 6.1. Packaging Applications

Eggs and dairy products, meat, fish and poultry, cold drinks or packaged foods. All of these products do not deteriorate when packaged securely with polystyrene packaging materials. When good packaging, cooling and transportation practices are put together in western society, only two percent of the food is wasted and wasted, while in developing countries this rate is 50 percent. Polystyrene has proved to be a versatile and cost-effective solution for packaging and disposable food packages whatever the product package.

### 6.2. Electronic Appliance Applications

Polystyrene resins meet virtually all finished product requirements in refrigerators, air conditioners, ovens, microwave ovens, hand held vacuum cleaners and mixers. Polystyrene resins are safe, low cost, and have excellent functionality due to their excellent appearance and easy process ability. For this reason, almost 26 percent of the polystyrene demand is used for injection molding, extrusion and thermoforming.

### 6.3. Consumer Electronics Applications

Polystyrene is used everywhere in TV casters where it is the use criterion for any new trend emerging in IT equipment, i.e. combination of function, shape, aesthetics and cost/high performance ratio. Polystyrene is the first choice in media boxes, cassette boxes and valuable transparent boxes that protect CDs and DVDs.

### 6.4. Construction Applications

Polystyrene resins are among the most popular materials used in building and building applications such as insulating foam, roofing, facade cladding, panels, bath and shower units, lighting fixtures and fixtures. Polystyrene resins are used in these building products because of their excellent price/performance balance, good workability and other performance characteristics.

## 6. MAIN APPLICATION AREAS FOR POLYSTYRENE IN TURKEY

### 6.5. Medical Applications

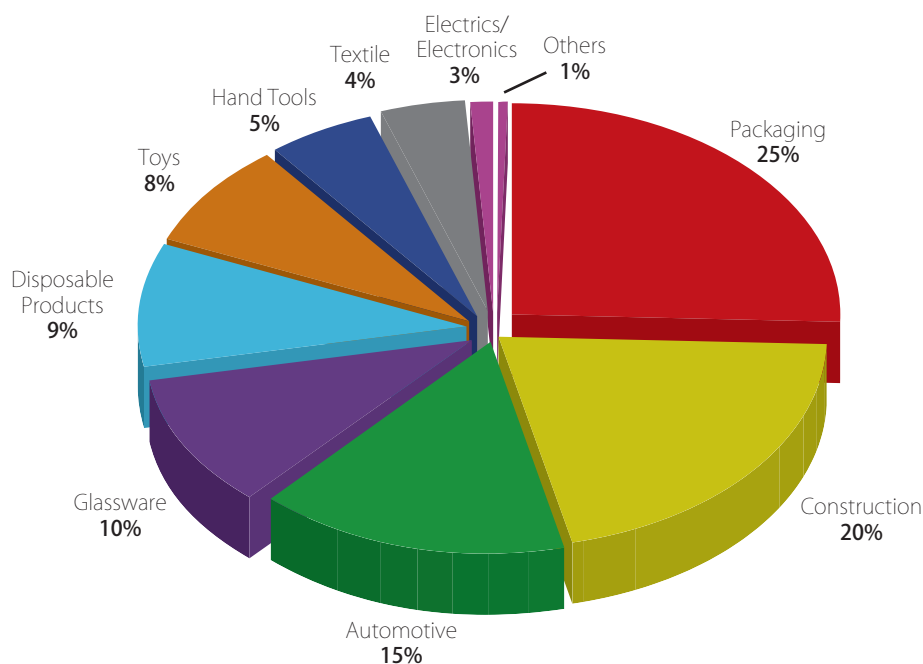
Delivering new and better medical technologies to patients and doctors is a complex and timely process. Polystyrene resins are used in the production of many disposable medical applications such as tissue culture trays, test tubes, petri dishes, diagnostic components and test kit containers due to excellent clarity and workability and superior post-sterilization aesthetics.

### 6.6. Other Applications

In addition to the general use of polystyrene, consumer goods such as toys, electric lawn and garden equipment, kitchen and bathroom accessories and other durable goods are produced from polystyrene. Polystyrene resins have an excellent cost/performance ratio and are often used in place of more costly polymers. About % 15 of total EPS consumption comes from exports in Turkey. Only 1% of HIPS and GPPS consumption constitute from exports.

In Turkey, 25% of total polystyrene consumption is in packaging, 20% in construction, and 15% in automotive,

10% in glassware, 9% in single use and 8% in toy sectors. Other sectors account for 10% of total consumption.



**Graphic 8: Turkey's Polystyrene Consumption by Industries**  
Source: TurkStat and ITC Trade Statistics

## 7. SUPPLY AND DEMAND

It is observed that the annual average increase of Turkey's polystyrene production have realized as 3.3%, imports by 1.4%, exports by 4.6%, consumption by 1.7% and foreign trade deficit by 1.2% in the last 5 years. In 2017, 78% of domestic consumption was covered by imports while 17% of production was exported.

It is estimated that production to reach up to 185 thousand tons, imports 550 thousand ton, exports 35 thousand tons, domestic consumption 700 thousand tons in 2018. In this period, polystyrene foreign trade deficit is estimated to be 515 thousand tons, 79% of domestic consumption will be met by import while 19% of production will be exported.

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016	2018
Production	158	179	180	3.3	0.6	185
Imports	506	509	535	1.4	5.1	550
Exports	26	26	31	4.6	18.6	35
Domestic Consumption	638	662	684	1.7	3.3	700
Foreign Trade Deficit	-480	-483	-504	1.2	4.3	-515
Exports/Production	16	15	17			19
Imports/Domestic Consumption	79	77	78			79

**Table 13: Supply and Demand for Polystyrene in Turkey**

Source: TurkStat and ITC Trade Statistics

The rapid growth trend in Turkish plastics industry has also caused the consumption for polystyrene and styrene to increase rapidly. But domestic production is far from this consumption. Consumption forecasts

indicate that import dependency for polystyrene will be over 80% by 2020. From this point of view, Turkey seems to have an important market qualification for existing or potential petrochemical facilities in terms of production of polystyrene.



**PAGEV**



**TURKISH PVC**  
INDUSTRY FOLLOW-UP REPORT  
**2017**

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## 1. PLASTIC RAW MATERIALS COVERED BY REPORT

The plastic raw material covered by the analysis is Polymers of Vinyl Chloride or Other Halogenated Olefins

of HS Code 39.04. In the analysis, foreign trade data is taken as 39.04 GTIP sum.

HS Code	Definition
39.04	Polymers of vinyl chloride or other halogenated olefins (in the first form):
	Poly (vinyl chloride) (not mixed with any other substance) (PVC)
3904.10.00.00.11	Emulsion poly (vinyl chloride) (E-PVC)
3904.10.00.00.19	Others
	Other poly (vinyl chloride):
3904.21.00.00.00	Non-plastic PVC
3904.22.00.00.00	Plasticized PVC
3904.30.00.00.00	Vinyl chloride-vinyl acetate copolymers
3904.40.00.00.00	Other vinyl chloride copolymers
3904.50	Vinylidene chloride polymers:
3904.50.10.00.00	Copolymer of acrylonitrile with vinylidene chloride (diameter 4 micrometers or more in the form of expandable spheres, but not exceeding 20 micrometers)
3904.50.90.00.00	Others
	Fluorine polymers:
3904.61.00.00.00	Polytetrafluoroethylene (PTFE)
3904.69	Others:
3904.69.10.00.00	Polyvinyl fluoride (any of the forms specified in note 6 (b) of this chapter)
3904.69.20.00.00	Fluor elastomer FKM
3904.69.80.00.00	Others
3904.90.00.00.00	Polymers of vinyl chloride or other halogenated olefins

**Table 1: Polymers of Vinyl Chloride or Other Halogenated Olefins of HS Code 3904**

Source: TurkStat and ITC Trade Statistics

## 2. INSTALLED CAPACITY

The only plant producing PVC in Turkey is Petkim and its

current production capacity is capable of producing 150,000 tons of PVC per year.

Initial Capacity	105,000 ton/year
Date of Operation	1986
Extension History	1995, 2001
Capacity after extension	150,000 ton /year

**Table 2: Petkim's PVC Production Capacity and Products**

Source: Petkim Annual Reports

Primary end uses of PVC produced by Petkim are agriculture and construction industries (irrigation pipes, drain pipes, fittings manufacturing) packaging film, cable coverings, transparent cosmetic and oil bottles,

manufacture of various tubes and other bottles, foot beds, floor bedsteads, various construction materials (door, window profiles, shutter manufacture) floor covering and manufacture of artificial leather.

## 3. PRODUCTION AND CAPACITY UTILIZATION

PVC production and capacity utilization of Petkim between 2013 and 2017 are given in the table and graphic below and PVC production of the company has reached its maximum level with 157 thousand tons in 2002 and 2004. PVC production realized as 148 thousand tons in 2017.

PVC production annually increased by 4.2% on amount and decreased by 0.1% on value basis during 2013-2017 period. PVC production increased by 11.8% on amount and by 20.8 on value basis in 2017 compared to 2016.

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
1000 Tons	121	128	143	4.2	11.8
Million \$	154	127	154	-0.1	20.8

**Table 3: Petkim PVC Production**

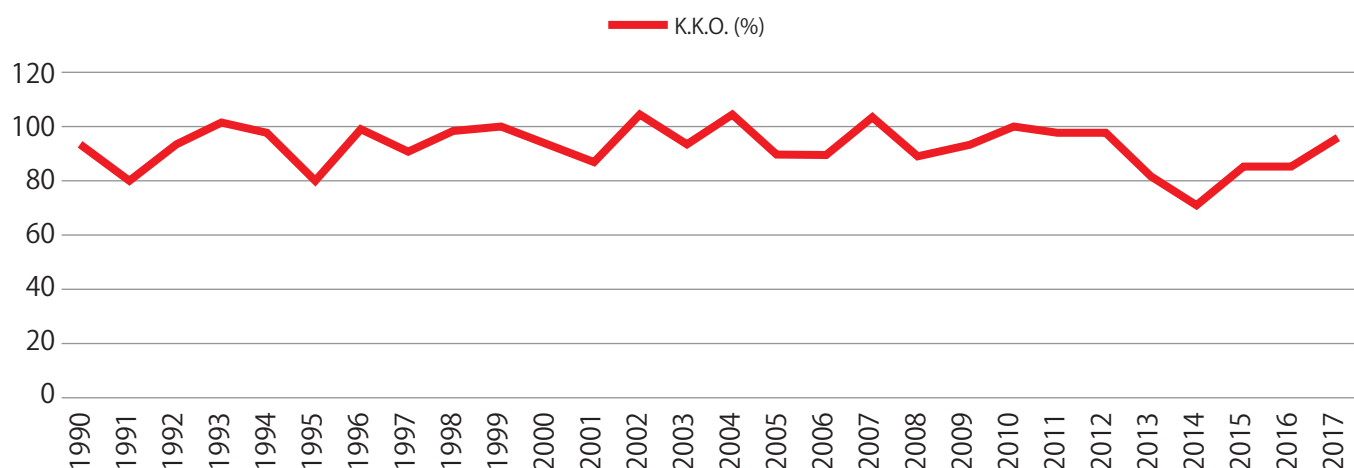
Source: Petkim Annual Reports

Petkim's capacity utilization in PVC production exceeded 100% in 1993, 2002, 2004 and 2007, but only 70% of the capacity was available in 2014.

Capacity utilization rose to 85% in 2015 and 2016 and realized as 95% in 2017.



### 3. PRODUCTION AND CAPACITY UTILIZATION



**Graphic 1: Petkim's PVC Capacity Utilization(%)**

Source: Pekim Annual Reports

### 4. FOREIGN TRADE

#### 4.1. IMPORTS

The total imports of PVC in Turkey during the period of 2013-2017 decreased by an average of 2.7% per year on amount and by 5.2% in terms of value and it decreased from 960 thousand tons to 860 thousand tons and from

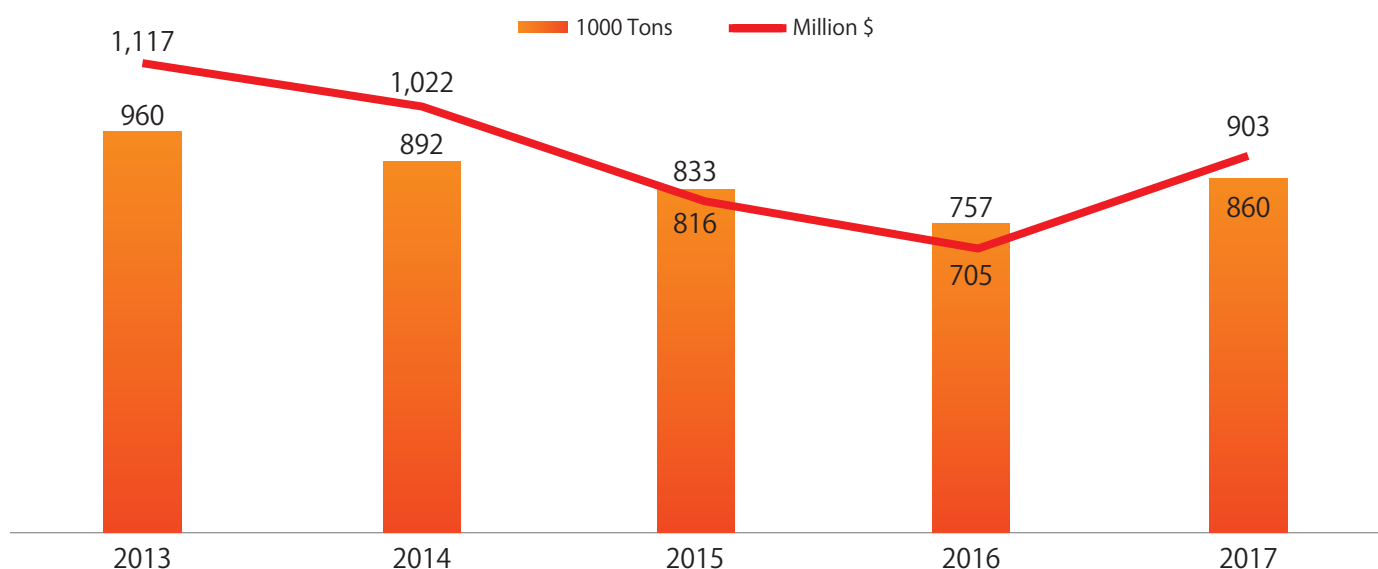
1 billion 117 million dollars to 903 million dollars. PVC imports increased 13.5% on amount and by 28.1% on value basis in 2017 compared to 2016.

	2013	2016	2017	CAGR % 2013-2017	% Artis (2017/2016)
1000 Tons	960	757	860	-2.7	13.5
Million \$	1,117	705	903	-5.2	28.1

**Table 4: PVC Imports of Turkey**

Source: TurkStat and ITC Trade Statistics

## 4. FOREIGN TRADE



**Graphic 2: PVC Imports of Turkey**

Source: TurkStat and ITC Trade Statistics

In 2017, 94% of Turkey's total PVC imports on amount and 89% of on value accounted for PVC which was not mixed

with any other substances.

HS Code	Definition	Amount Base	Value Base
39.04.10	Polyvinyl chloride (not mixed with any other substance)	93.76	89.11
39.04.21	Un plasticized PVC	0.50	0.73
39.04.22	Plasticized PVC	2.06	3.43
39.04.30	Vinyl chloride-vinyl acetate copolymers	0.20	0.38
39.04.40	Other vinyl chloride copolymers	3.17	2.98
39.04.50	Vinylidene chloride polymers	0.01	0.07
39.04.61	Polytetrafluoroethylene (PTFE)	0.19	1.71
39.04.69	Polyvinyl fluoride (any of the forms specified in Note 6 (b) of this chapter)	0.10	1.59
39.04.90	Others	0.00	0.00
	Total	100.0	100.0

**Table 5: PVC Imports by HS Codes (%) 2017**

Source: TurkStat and ITC Trade Statistics

### 4.2. EXPORT

The total exports of PVC in Turkey during the period of 2013-2017 have decreased by an average of 6.6% per annum on amount and by 11.8% per annum on value basis and have fallen from 19 thousand tons to

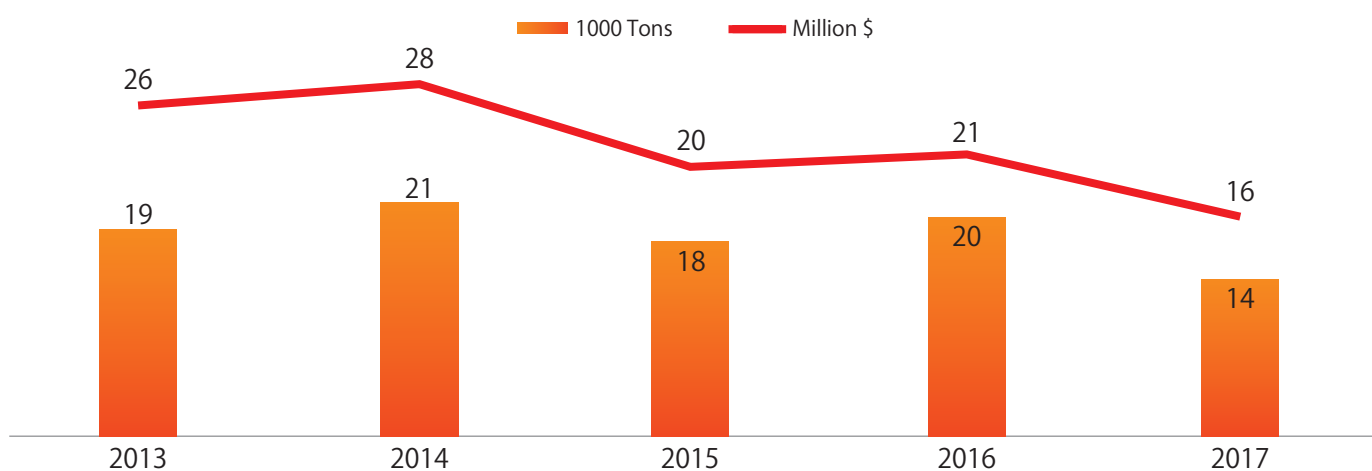
14 thousand tons and from 26 million dollars to 16 million dollars. PVC exports declined by 29% on amount and 26% on value basis in 2017 compared to 2016.

## 4. FOREIGN TRADE

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
1000 Tons	19	20	14	-6.6	-29.0
Million \$	26	21	16	-11.8	-26.3

**Table 6: PVC Exports of Turkey**

Source: TurkStat and ITC Trade Statistics



**Graphic 3: PVC Exports of Turkey**

Source: TurkStat and ITC Trade Statistics

In 2017, 43% of Turkey's total PVC exports on amount and 42% of on value basis amounted to PVC not mixed with any other substance.

In the mentioned period, plastified PVC received a 42% share of total PVC exports on amount basis and 40% in value basis.

HS Code	Definition	Amount Base	Value Base
39.04.10	Polyvinyl chloride (not mixed with any other substance)	42.6	41.7
39.04.21	Unplasticized PVC	3.5	3.4
39.04.22	Plasticized PVC	41.7	39.5
39.04.30	Vinyl chloride-vinyl acetate copolymers.	0.0	0.0
39.04.40	Other vinyl chloride copolymers	0.1	0.2
39.04.50	Vinylidene chloride polymers	0.1	0.1
39.04.61	Polytetrafluoroethylene (PTFE)	0.2	2.0
39.04.69	Polyvinyl fluoride (any of the forms specified in Note 6 (b) of this chapter)	0.3	2.9
39.04.90	Others	11.6	10.2
	Total	100.0	100.0

**Table 7: PVC Exports by HS Codes (%) (2017)**

Source: TurkStat and ITC Trade Statistics

## 4. FOREIGN TRADE

### 4.3. FOREIGN TRADE DEFICIT

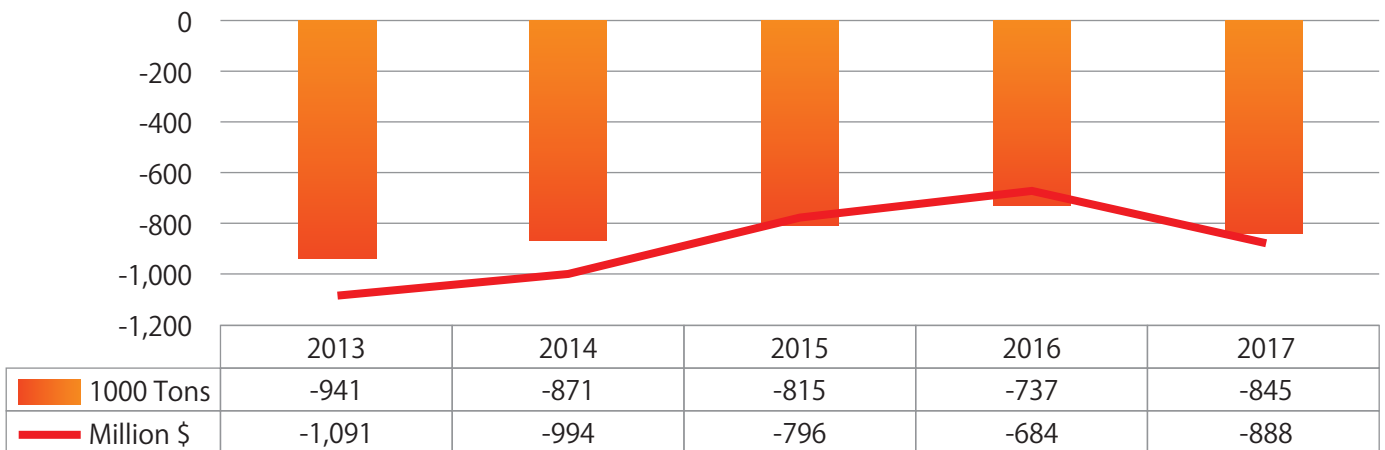
Turkey gives deficit in PVC foreign trade on both amount and value basis. PVC foreign trade deficit which was 941 thousand tons and 1 billion 91 million dollars in 2013, decreased to 845 thousand tons and 888 million dollars in 2017. In this period, the annual average decreasing in foreign trade deficit realised as 2.6% on amount and 5% on value basis.

It is estimated that the foreign trade deficit of 618 thousand tons and 644 million dollars in the 9 months of 2017 will be 824 thousand tons and 859 million dollars at the end of 2017 increasing by 11.8% on amount and 25.6% on value basis. In 2017, foreign trade deficit of PVC increased by 14.7% on amount and 29.8% on value basis.

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
1000 Tons	-941	-737	-845	-2.6	14.7
Million \$	-1,091	-684	-888	-5.0	29.8

**Table 8: PVC Foreign Trade Deficit**

Source: TurkStat and ITC Trade Statistics



**Graphic 4: PVC Foreign Trade Deficit**

Source: TurkStat and ITC Trade Statistics

In 2017, PVC imports of Turkey accounted for 12% of total plastic raw material imports on amount and 9% on

value basis. In the same period, the share of PVC exports in total plastic raw material exports was 2% on amount and on value basis

## 4. FOREIGN TRADE

### 4.4. IMPORTS BY COUNTRIES

In 2017, Turkey has realized 73% of PVC imports on amount and 72% on value basis from 10 countries.

France, USA, Germany, Mexico and Spain are Turkey's main import partners.

Countries	1000 Tons	Million \$	% -Ton	% -\$
France	142	146	16.5	16.1
USA	106	106	12.4	11.7
Germany	72	83	8.4	9.2
Mexico	74	73	8.6	8.1
Spain	60	59	7.0	6.6
S.Korea	45	44	5.2	4.9
Sweden	41	44	4.8	4.8
Norway	33	34	3.8	3.8
Belgium	31	31	3.6	3.5
UK	27	30	3.1	3.3
10 Countries Total	631	650	73.4	71.9
Others	229	254	26.6	28.1
Total	860	903	100.0	100.0

**Table 9: PVC Imports of Turkey by Countries (2017)**

Source: TurkStat and ITC Trade Statistics

### 4.5. EXPORTS BY COUNTRIES

In 2017, Turkey has realized 71% of its PVC exports on amount and 66% on value basis to 10 countries. Bulgaria,

Azerbaijan, Georgia, Bursa Free Trade Zone and Turkish Republic of Northern Cyprus (TRNC) constitute the main export partners.

Countries	1000 Tons	Million \$	% -Ton	% -\$
Bulgaria	4.3	4.3	22	20
Azerbaijan	2.1	1.8	11	8
Georgia	1.6	1.3	8	6
Bursa Free Trade Zone	1.0	1.2	5	6
Nort Cyprus Turkish Rep.	1.1	1.1	6	5
Algeria	1.2	1.1	6	5
Israel	0.8	1.0	4	5
Kazakhstan	0.8	0.8	4	4
Iran	0.4	0.7	2	3
Ukraine	0.5	0.7	2	3
10 Total	13.9	14.1	71	66
Others	5.6	7.4	29	34
Total	19.4	21.5	100	100

**Table 10: PVC Exports of Turkey by Countries (2017)**

Source: TurkStat and ITC Trade Statistics

## 4. FOREIGN TRADE

### 4.6. IMPORTS AND EXPORT PRICES

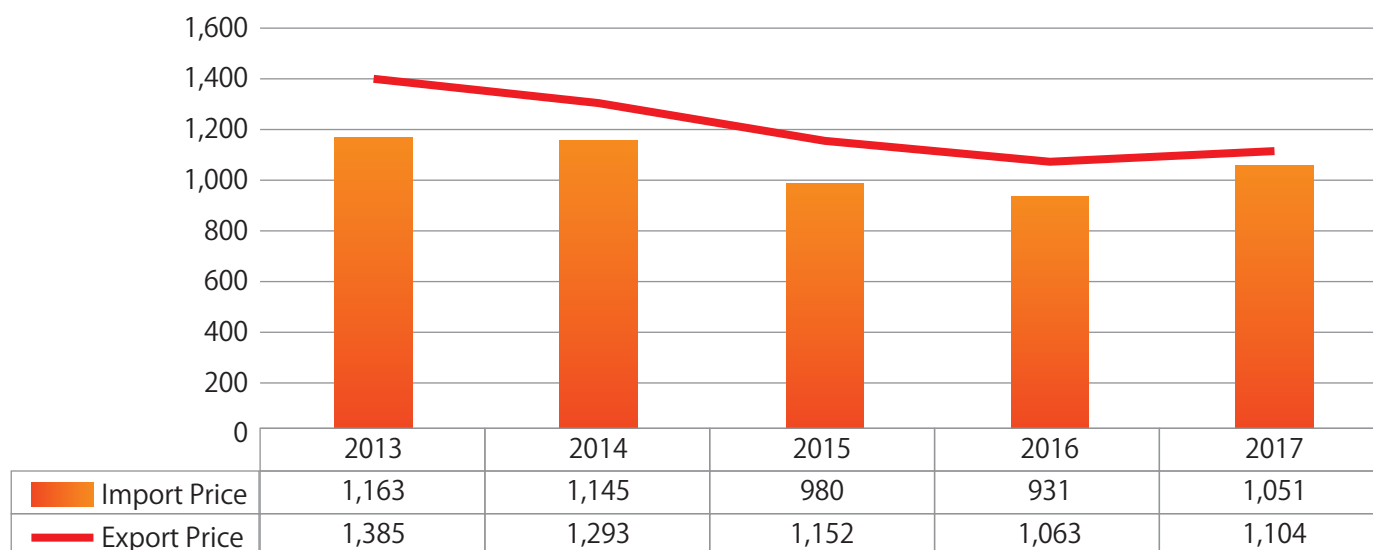
Turkey's PVC average export prices have been above the average import prices in the last 5 years. The unit import price of 1,163 \$/kg in 2013 decreased to 1,051 \$/kg in 2017, while the export price of 1,385 \$/kg decreased to

1,104 \$/kg. During this period, the import prices fell by an average of 2.5% per annum and export prices decreased by 5.5%. In 2017, the import price increased by 12.8% and export price by 3.9% compared to 2016.

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
Import Price	1,163	931	1,051	-2.5	12.8
Export Price	1,385	1,063	1,104	-5.5	3.9

**Table 11: PVC Import and Export Prices of Turkey (\$/Ton)**

Source: TurkStat and ITC Trade Statistics



**Graphic 5: PVC Import and Export Prices of Turkey (USD/Ton)**

Source: TurkStat and ITC Trade Statistics

## 5. DOMESTIC CONSUMPTION BY INDUSTRIES

PVC consumption in Turkey declined by an average of 1.8% per annum on amount and 4.4% on value basis in 2013-2017 period, decreasing to 988 thousand tons

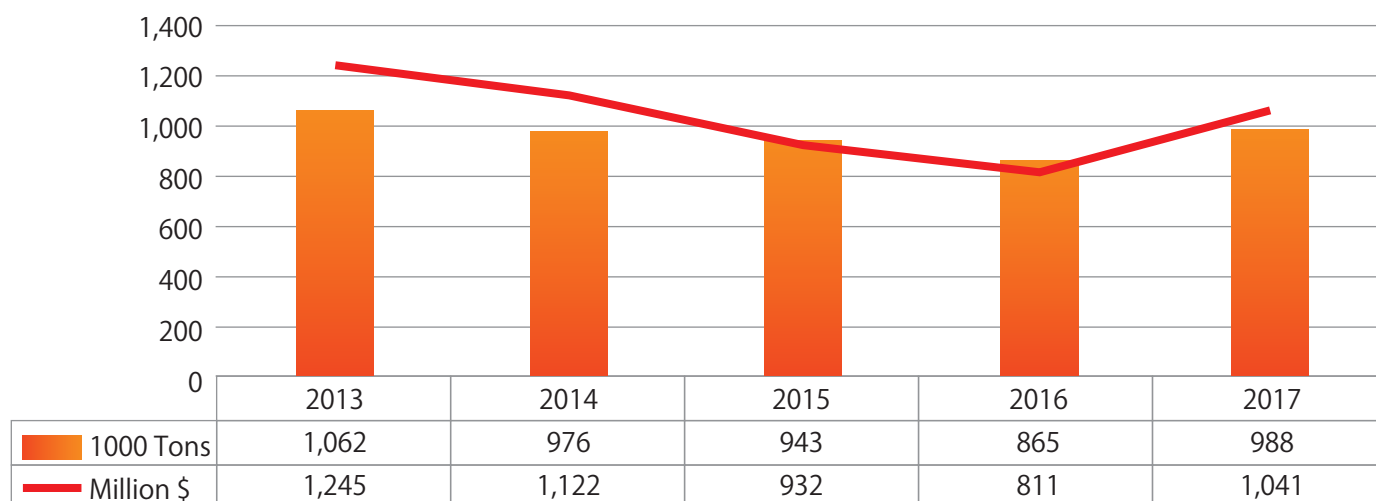
and 1 billion 41 million dollars in 2017. In 2017, domestic consumption increased by 14.2% on amount and 28.4% on value basis compared to 2016.

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016
1000 Tons	1,062	865	988	-1.8	14.2
Million \$	1,245	811	1,041	-4.4	28.4

**Table 12: PVC Domestic Consumption of Turkey**

Source: TurkStat and ITC Trade Statistics

## 5. DOMESTIC CONSUMPTION BY INDUSTRIES

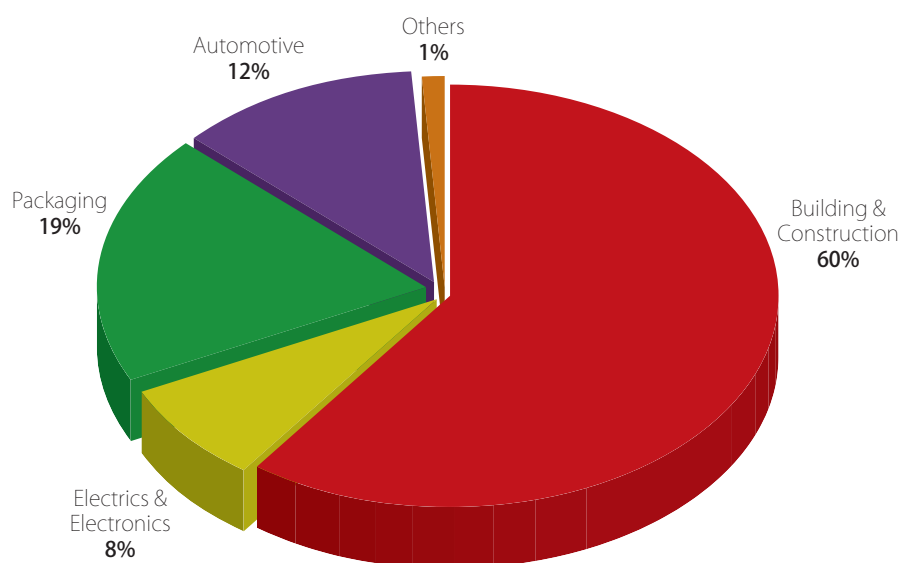


**Graphic 6: PVC Domestic Consumption of Turkey**

Source: TurkStat and ITC Trade Statistics

The main industries where PVC is used in Turkey are; building and construction, packaging, electrical and electronics and automotive. The packaging industry uses 60% of total PVC consumption. The packaging

shares 19%, automotive 12% and electricity and electronics 8% in total PVC consumption. About 3% of consumption comes from exports in Turkey as of 2016.



**Graphic 7: PVC Consumption by End Users Industries in Turkey**



## 5. DOMESTIC CONSUMPTION BY INDUSTRIES

### Construction Sector

Connection parts for pipe and water distribution, irrigation and sewerage; gray water recycling kits; electrical conduit; exterior coverings, tents, moldings, skirting, air stripping, landings and landing pipes; decking and fencing; windows, door frames and coverings; debone shirts & geomembranes; swimming pool liners; single store roof; conveyor belts; pipelines used in food processing, chemical processing and other manufacturing; floor and wall coverings; coated panels; adhesives,

### Automotive industry

Inner laying; "soft" panel and arm rests; panel instrument components, air cushion covers; body side seals, bumper protectors; glass system components, rearview mirror cradles; under-cable; vehicle wear coatings underneath; mats; adhesives and sealants; boots and bellows; battery separators; audio and video components; lighting elements; lid and gearbox parts steering; components of the a / c system,

### Health sector

Blood bags and hoses; cannula; covers; catheters; connectors; cushioning products; device packages; dialysis machines and tubing; drainage pipe; dripping rooms; ear protection; glasses; swelling alter; inhalation masks; iv containers and components; laboratory equipment; masks; spokesmen; oxygen delivery components; seals; surgical wire; sheathing; thermal blankets; urine and colostomy bags

### Electric - Electronic Sector

Computer housing and cabling; printed circuit board tray; power wire insulation & mantle; communication cable mantle; support for power cable; electrical plugs and connectors, wall plates, junction boxes; soft keyboards; keyboard tray; coating for optical mouse pad; memory stick and usb / enclosures; led product components; laminate and smart cards for plastic security

### Packaging Sector

Sterile medical packaging; sabotage rehearsed over-the-counter drug; shrink wrap for software, games, and home products; toys such as eggs and meat, hardware, electronics, personal care products, and blisters and capped packaging to protect food; household and personal care products, cooking oils and bottles for automotive oils; covers for bottles and jars; glass coverings,

### Other Consumption Materials

Wind turbine blades; machine parts; enclosures and arms for vehicles; garden hoses; brenda; patio furniture, upholstery; device bodies; window shutters and shutters; table covers, floor cushions, shower curtains; sports equipment, beach collectibles; vinyl leather goods; luggage, shoes, gloves, raincoats; bag; clothing; coated paper; holiday ornaments; toys,



## 6. SUPPLY AND DEMAND

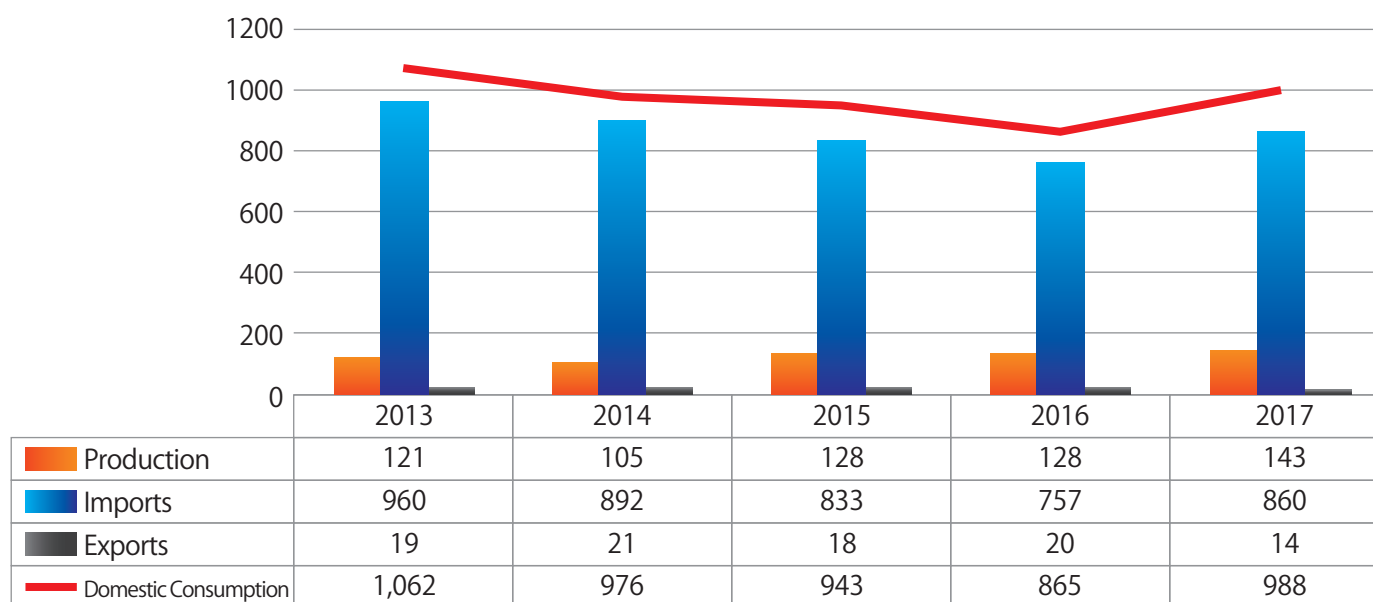
During the period from 2013 to 2017, total PVC production in Turkey increased by 4.2% on average, while imports decreased by 2.7%, exports by 6.6% domestic consumption by 1.8% and foreign trade deficit by 2.6%. Around 87% of domestic consumption was met by imports and 10% of production was exported in 2017.

It is expected that the production will be 145 thousand tons, imports 946 thousand tons, exports 15 thousand tons, domestic consumption 1 million 76 thousand tons. In 2018, foreign trade deficit is estimated to be 931 thousand tons in the same period.

	2013	2016	2017	CAGR % 2013-2017	% Increase 2017/2016	2018/E
Production	121	128	143	4.2	11.8	145
Imports	960	757	860	-2.7	13.5	946
Exports	19	20	14	-6.6	-29.0	15
Domestic Consumption	1,062	865	988	-1.8	14.2	1,076
Foreign Trade Deficit	-941	-737	-845	-2.6	14.7	-931
Imports/Domestic Consumption (%)	90	88	87			88
Exports/Production (%)	15	16	10			10

**Table 13: Supply and Demand for PVC in Turkey (1000Ton)**

Source: TurkStat and ITC Trade Statistics



**Graphic 8: Supply and Demand for PVC in Turkey (1000Ton)**

Source: TurkStat and ITC Trade Statistics

Turkey is one of the important PVC importer countries of the world, however, since domestic production is not carried out in emulsion PVC, demand is fully covered by imports, domestic consumption estimates suggest that

import dependency of PVC will be over 90% in coming years. From this point of view, Turkey seems to have an important market qualification for existing or possible petrochemical plants for PVC production.



## 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

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. PAGEV PROJECTS

### 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



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