

**PÜKAD**  
PENCERE VE KAPI SEKTÖRÜ DERNEĞİ

**YEAR 2023**

**TURKISH WINDOW AND  
GLASS MARKET REPORT**

[www.pukad.org](http://www.pukad.org)

## 2023 TURKISH WINDOW AND GLASS MARKET REPORT

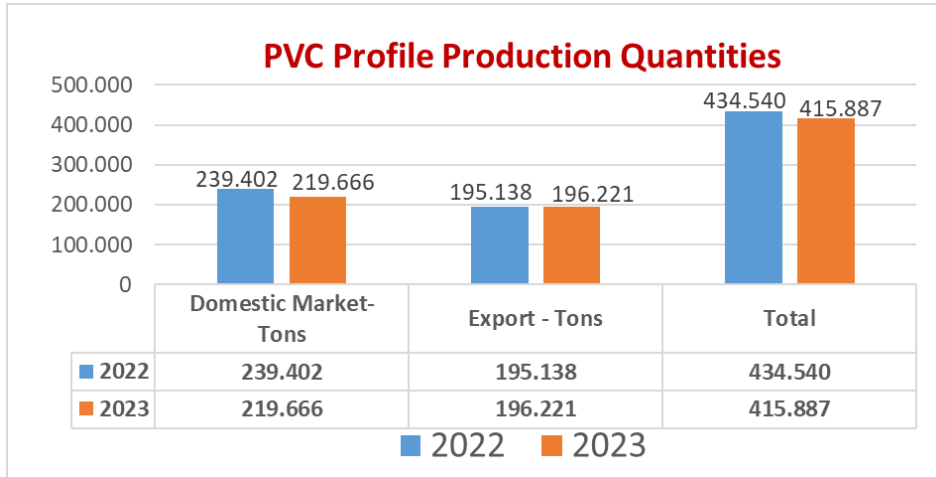
### 1- INTRODUCTION

This report provides an overview of the Turkish window market in 2023 based on TURKSTAT data and presents quantitative data in relation to glass and accessories used for windows.

### 2- SUMMARY

In 2023, PVC windows were produced for **1.367 million** residential units. The amount of residential units was calculated by reducing old/new residential units and non-residential common areas to typical residential units. A vast majority of the 35.89 million sqm of flat glass to be used in PVC windows and doors produced in 2023 was used as double glazing and the rest as triple glazing. **10.58 million** espagnolettes were used for the opening and closing of windows and doors produced in 2023; about half of them were single-opening and the other half were double-opening windows.

**415,887 tons** of PVC profiles were produced in 2023. Of this figure, **196,221 tons** were exported as profiles, while the remaining **219,666 tons** were converted into windows and doors in the domestic market. While **30,073 tons** of PVC windows produced in the domestic market were exported, **5,899 tons** of profiles and windows were imported. Imported windows achieved a share of 1.5%.



### 3- REPORT STRUCTURE

The first part of the report addresses residential construction activities in the last **7** years based on TURKSTAT data. The figures in this part serve as a basis for the calculation of every type of windows to be used in new buildings on an annual basis. Windows are also used in non-residential buildings and restoration of old structures (residential and non-residential). Part of the report is allocated to the description of this type of works and calculation assumptions.

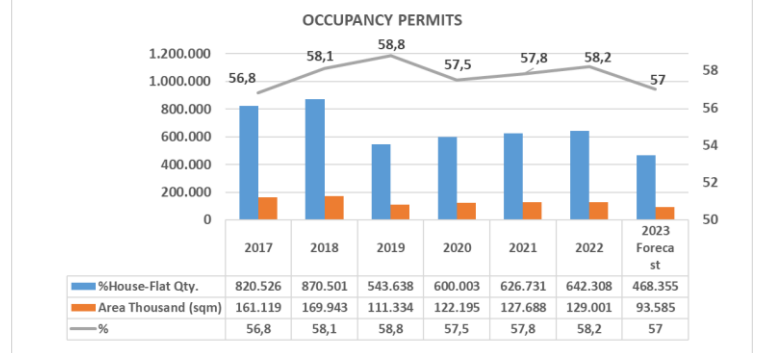
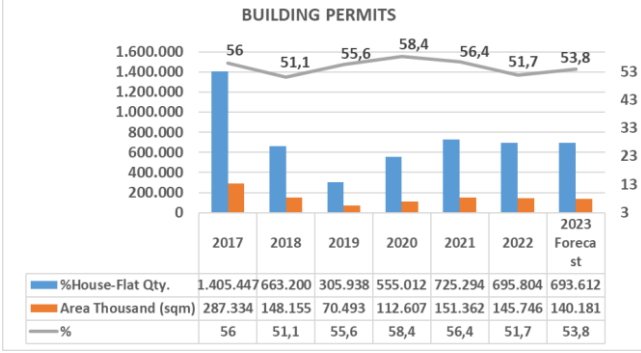
The next part contains general definitions and explanations related to windows. The subsequent part of the report presents assumptions and technical data related to PVC windows.

7-year Import-Export quantities and USD values for PVC raw material, PVC ready-made windows and PVC profiles are presented based on TURKSTAT data.

It is completed by estimation of glass and accessories used in PVC windows and projections for year 2023 PVC market. The report is concluded with a warning and expectation paragraph.

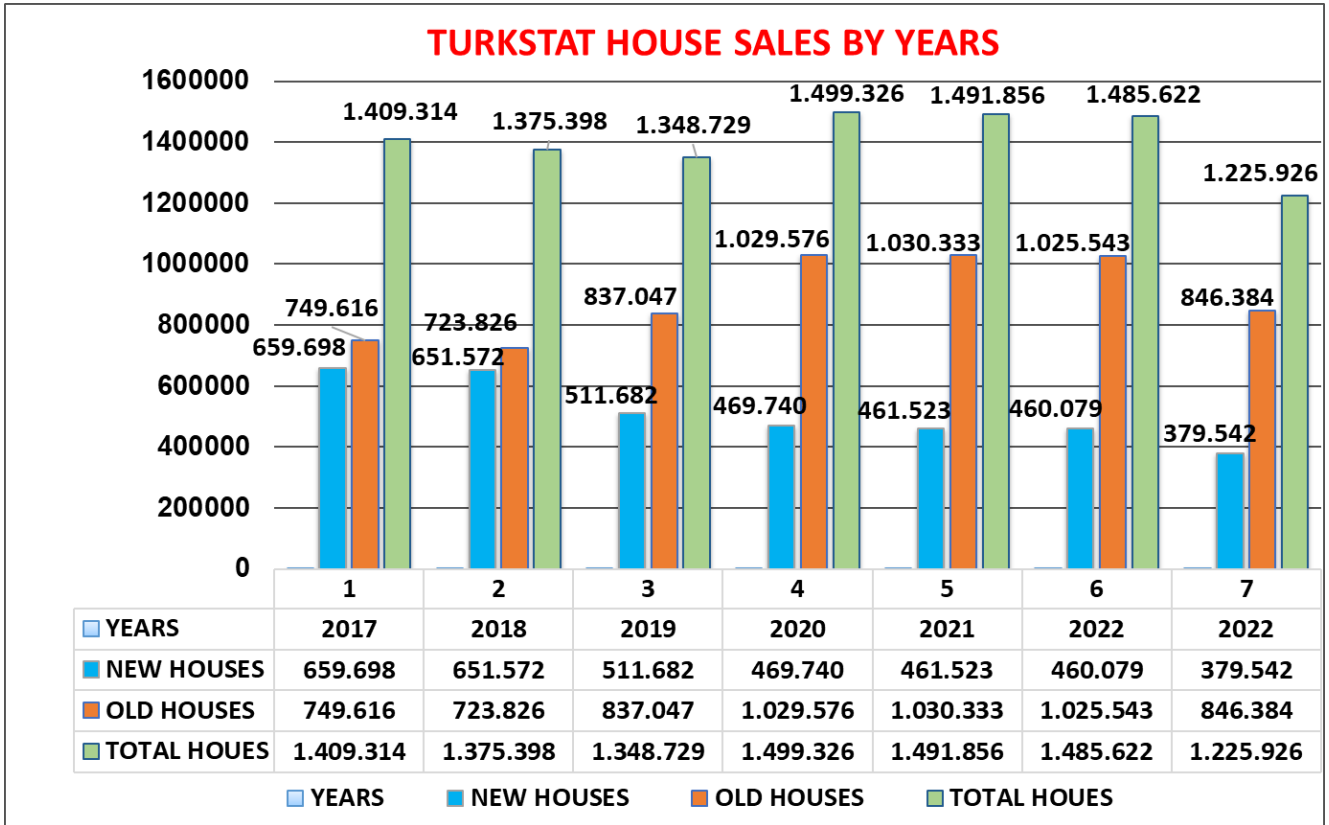
#### 4- RESIDENTIAL PRODUCTION AND SALES STATISTICS

##### BUILDING AND OCCUPANCY PERMITS SECURED IN THE LAST 7 YEARS



The sum of apartments corresponding to the square meter area of building permits obtained in the last 7 years has approached the number of apartments corresponding to the square meter area of occupancy permits. In a sense, we have entered a period when virtually all that has been constructed has been sold.

In conclusion, it is seen that the rate of residential units in constructions with a **building permit** is **53.8%**, whereas the rate of residential units with an **occupancy permit** is **57%**. This makes it quite easier to calculate actual window and glass usage.

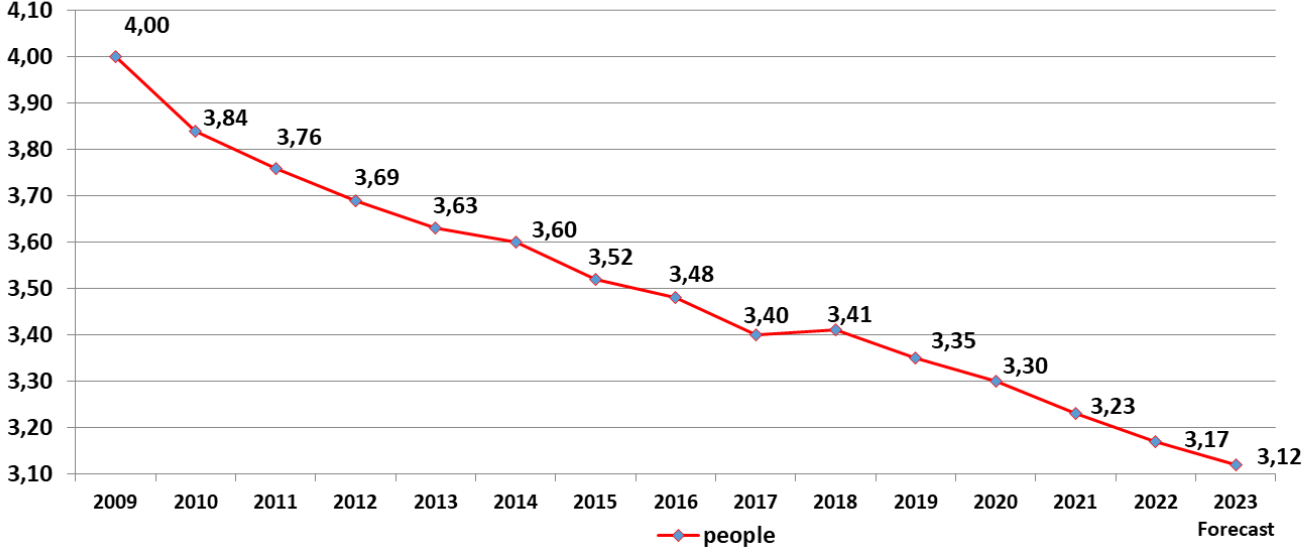


In terms of housing sales in 2023, old-second hand residential units accounted for **69%**, while new residential units accounted for **31%**.

## 5- POPULATION OF TURKEY AND ESTIMATED NUMBER OF HOUSEHOLDS IN 2023

Assuming that the population of Turkey in 2023 was **85,372,377** and an average household consisted of **3.12** people in 2023, it can be said that the number of households in Turkey is **27,362,941**.

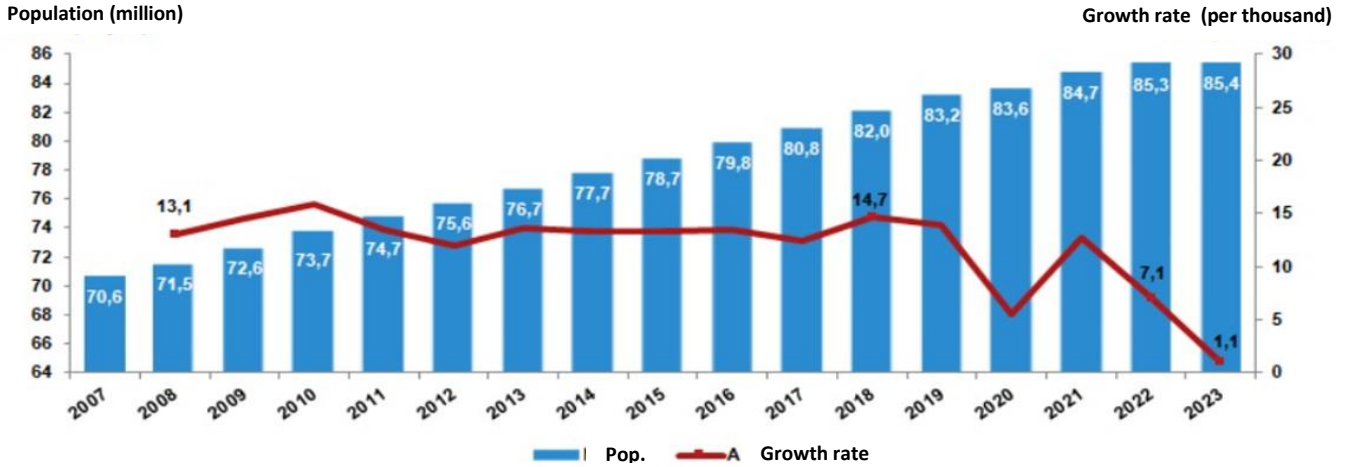
### Number of People



The total number of houses in Turkey (houses, boarding, winter houses/seasonal houses, housekeeper's apartments and house constructions) is **41.3 million** in 2023, and for the year 2023, there are **0.48** residential units per capita. In this case, there are **3.12 x 0.48 = 1.50 houses** per household consisting of **3.12** people.

The annual population growth rate, which was **7.1** thousandths in 2022, was **1.1** thousandths in 2023, the lowest in recent years.

Population and annual growth rate, 2007 – 2023



## 6- URBAN TRANSFORMATION AND EARTHQUAKE HOUSES

Increases in the cost of energy, logistics and similar items, which are part of the inputs used in the production of building materials, have outpaced general inflation, pushing up the prices of new and existing homes. In 2023, the increase in interest rates for consumer loans for house purchase reduced the sales of new and old second-hand houses by **17.5%** in comparison with the previous year.

The **7.5** and **7.6** magnitude earthquakes, centred in Kahramanmaraş and affecting **11** provinces, claimed more than **53,000** lives, injured nearly **107,000**, affected **14,000,000** people living in the earthquake-stricken district and caused nationwide grief.

According to the damage assessment data made at the first moment of the earthquake, a total of **850,000** independent units, consisting of **680,000** independent houses and **170,000** commercial areas, were severely damaged and rendered unusable.

In the first stage, temporary shelters and workplaces for earthquake victims were built with containers, while construction began on reserve land with proven solid soil, and permanent houses were started to be handed over to the rightful owners upon completion.

It is estimated that **90%** of the windows and doors used in **215,000** containers and **46,000** independent permanent residences established in 2023 in the earthquake zone are made of PVC. If it is assumed that the PVC profile windows and doors used in a container are half of those used in a normal apartment, this equates to **215,000 x 0.5 = 107,500** residential units, and if this is combined with **46,000** independent houses, the number of residential units is **153,500**, and if it is assumed that **90%** of these are made of PVC, the resulting figure is **138,150** residential units.

### **7- COMMON AREAS AND NON-RESIDENTIAL BUILDINGS MARKET**

As it is known, the statistics related to new houses are as follows: There are no statistics from which practical results can be derived regarding material use in non-residential buildings. From the statistics related to factories, warehouses, hospitals, sanctuaries, schools, dormitories, civilian and military buildings, temporary lodging houses, shopping malls, and other commercial buildings, it was not possible to deduce results regarding use of materials, and in particular, of windows. In this regard, apart from the estimates related to the works performed by members of our association, the **common areas** for which occupancy permits were obtained were calculated to correspond to **175,838** residential units if we assume that these areas are equivalent to **21.4%** of the residential units according to TURKSTAT data.

At this point, the non-residential buildings for which occupancy permits were obtained were calculated to correspond to **176,660** residential units if we assume that these areas are equivalent to **21.5%** of the residential units according to TURKSTAT data.

These ratios are as follows in non-residential buildings: PVC **30%**, aluminum **69%**, other materials **1%**

In **2023**, non-residential buildings **176,660 X PVC 30% = 52,998 units of** equivalent non-residential units

Renewal of existing structures represents a significant area of use for the construction materials industry, and making healthy estimates brings about challenges.

#### **For PVC window industry, the following finding can be made:**

With the recent earthquakes and the emergence of the urban transformation concept, the plans for the replacement of windows were either deferred or waived in respect of many existing houses. This had a negative impact on the operations of window producers.

**The increased prices of new houses in the recent years did not only reduce the number of new house sales, but also led to an increase in second-hand house sales and window renewal sales.**

Starting from mid-**1990s**, double-pane PVC windows triggered a trend to replace old windows that used to suffer from great heat leakages. About **30** years later, a huge number of windows were replaced, and unreplaced window stock decreased.

**The recent increase in heating energy costs brought about a parallel increase the replacement of old PVC windows with new-generation PVC windows that offer quality insulation, aesthetical, functional and comfortable accessory systems.**

In the report, an assumption has also been made in respect of the ratio of newly produced PVC windows that are used in replacement works. As it is known, system producers manufacture profiles and deliver them to window producers. Many window producers of variable sizes that serve the end-customer and the number of which



exceed ten thousand are able to make a rough estimate of how many of the windows they produce are used for new buildings, and how many of them are used for old buildings. Indeed, the fact that there are also companies that do not produce windows, but carry out assembly services of the windows that they get subcontractors to produce makes it also difficult to make such estimates.

The annual growth rates of the construction materials industry are not equivalent to those of the sub-industries, giving rise to differences due to characteristics peculiar to every industry. Every industry does not enjoy the same share in the replacement market. In general, the total use of construction materials are not directly proportional to residential and non-residential building production also because:

Iron, steel and cement are used in higher quantities for infrastructural investments (roads and railways, water sets, ponds, airports, sport facilities, ports, etc.), and the exact quantity is not known.

## 8- TURKISH WINDOW MARKET

The common feature of products that are generally called as windows is that they consist of profiles, the spaces are completely or partially filled with glass, and are opened and closed with the help of hardware. The following products fall under the window definition:

- Windows
- Glass Balcony Doors
- Winter Gardens

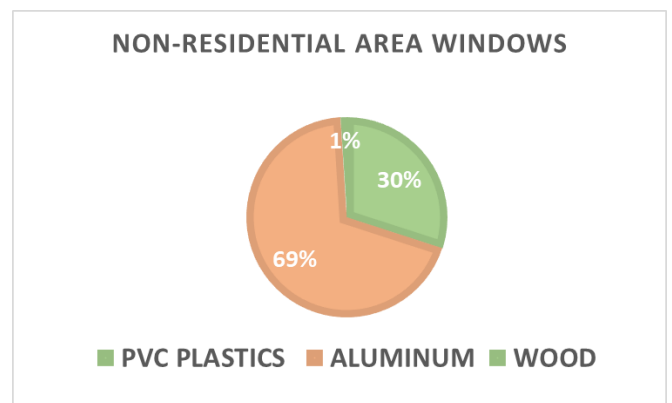
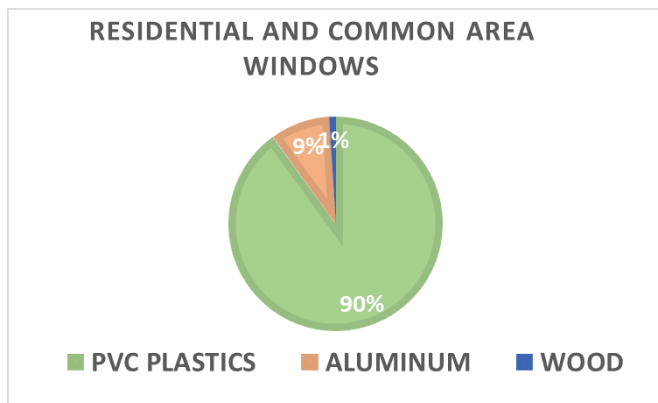
Products of the window industry are also used for interior partitions. This report does not provide an in-depth definition and description of this subject.

The window industry uses the following products as joinery materials:

- PVC joinery
- Aluminum joinery
- Wooden joinery
- Iron joinery
- Composite joinery (Products PVC/Aluminum/Wooden materials are used in combinations involving two or even three of them)

The information available to our association relating to usage ratios of different materials are presented below. However, this information might not be accurate and require confirmation.

- PVC, aluminum, wooden and other materials account for about **90%, 9%, and 1% of house and public area** production, respectively.



- These ratios are as follows in **non-residential buildings**: PVC **30%**, Aluminum **69%**, other materials **1%**

## 9- ASSUMPTIONS AND TECHNICAL DATA RELATED TO PVC WINDOWS

The following assumptions are used for the calculations specific to PVC windows:

- Sector statistics indicate that averagely **5.5** linear meters of main profile are used per sqm of PVC window.
- Averagely **9 kg** of PVC profiles are used per sqm of PVC window (**1** linear meter is used for auxiliary profiles like bar profiles which is considered to correspond to **1.6 kg** of PVC profile (**1.6 kg/linear meter x 5.5 linear meter / sqm = 9 kg / sqm**)).
- **5** foldable panes and **1** or **2** balcony doors are mounted in an average residential unit. The total area is approximately **15** sqm. These values represent the mean of old and new structures.
- Accordingly, **15 sqm x 9 kg / sqm = 135 kg** of PVC profiles are used per residential unit.

**In summary**, it is calculated that **15** sqm of windows, i.e. **135 kg** of PVC profile are used in **1** residential unit.

**Note:** As it is known, PVC Window System Producers that are members of PÜKAD have a market share above **60%**. There are also PÜKAD members among companies that produce windows by purchasing materials from system manufacturers. Assumptions were formed with estimated data derived from PÜKAD member system manufacturers and window manufacturers.

## 10- PVC WINDOW CALCULATION FOR THE YEAR 2023

In the light of the above assumptions, the PVC profile requirement for the PVC windows produced in 2023 was calculated as follows:

### a) New Residential and Common Areas

**468,355** PVC windows were used in **421,520** residential units based on the assumption of **90%** PVC usage in new residential units.

The profile weight of PVC windows used in these residential units is **421,520 x 0.135 tons = 59,905 tons**.

At this juncture, consideration should be given to the following point: It was assumed that each residential unit has **15** sqm windows on average. However, in the buildings or housing estates where the residential units are located, there are also windows in places such as stairwells, basements, outbuildings, security and social facilities that are not part of the residential units, and these windows are about **21.4%** of the residential windows. We can also call these as **common areas**.

Therefore; there are additionally

**421,520 x 20% = 84,237** residential units with PVC windows, and in aggregate, there are

**421,520 + 84,237 = 505,756** residential units with PVC windows.

Thus, PVC profile requirement would be **505,756 x 0.135 = 68,277 tons** for PVC window profile production.

As a result, the total weight of PVC profiles in PVC windows produced for the new residential and common areas which were built in 2023 and which, according to official records, comprise **505,756** PVC windows, would be **68,277 tons**.

### b) Non-residential buildings

In our country, apart from new residential constructions, non-residential buildings are constructed at a ratio of **21.5%** of the residential buildings on a surface area basis. However, the usage rate of PVC windows in such structures is approximately **30%**.

**176,660** equivalent residential units x **30%** = **52,998**, which gives us the number of equivalent residential units with PVC windows.

If we are to calculate the weight of PVC profiles used in **non-residential** units in **2023**, it would be **52,998** apartments x **0.135 = 7,155 tons** of PVC profile.

### Earthquake-stricken region houses

If we are to calculate the weight of PVC profiles used in containers and independent houses in the earthquake-stricken region in **2023**, it would be **138,150** apartments x **0.135** = **18.650 tons** of PVC profile.

### In conclusion;

In 2023, in new buildings;

- PVC windows were produced for **558,642** residential units and equivalent residential units;
- The end-to-end area of these windows reached **8,379,630** sqm; and
- **75,417** tons of PVC profiles were used for window production.

This quantity represents the net weight and **80,696** tons of PVC profiles were used in window production with approximately **7%** cutting and production waste.

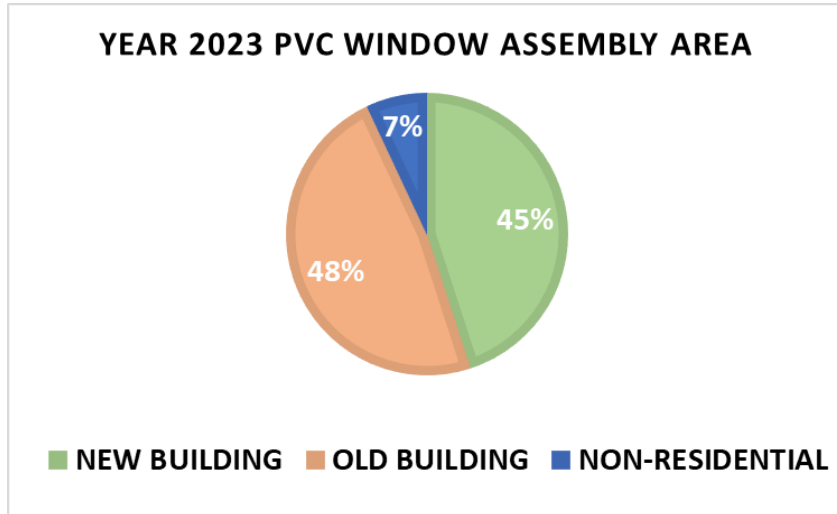
### c) Dealer speculations and forecasts for the Window replacement market

According to the estimated average information received from window producing dealers of the PVC profile system manufacturers, of the PVC windows produced Turkey-wide;

45% were used in new buildings : **558,642** equivalent residential units

48% were used in old buildings : **585,218** equivalent residential units

7% were used for non-residential replacement : **85,344** equivalent residential units



For old residential and non-residential window replacements: **670,562** equivalent residential units.

If we are to calculate the weight of PVC profiles used in old buildings and non-residential replacement in **2023**, it would be **670,562** equivalent residential units x 0.135 = **90.525** tons of PVC profile. This quantity represents the net weight and **96,862** tons of PVC profiles were used in window production with approximately **7%** cutting and production waste.

In total, **184,593** tons of PVC profiles were used for **1,367,354** equivalent residential units, including **1,229,204** residential units and **138,150** houses estimated to be used in the earthquake-stricken region for new residential, old residential and non-container window renovation.

According to TURKSTAT September 2023 data, the housing stock in our country reached **41.3** million independent housing stock. This data does not include second houses, summer houses, empty houses that are not rented out. When historical replacement rates are taken into account, it can be said that replacements were made in one or **2%** of every **50** residential units.

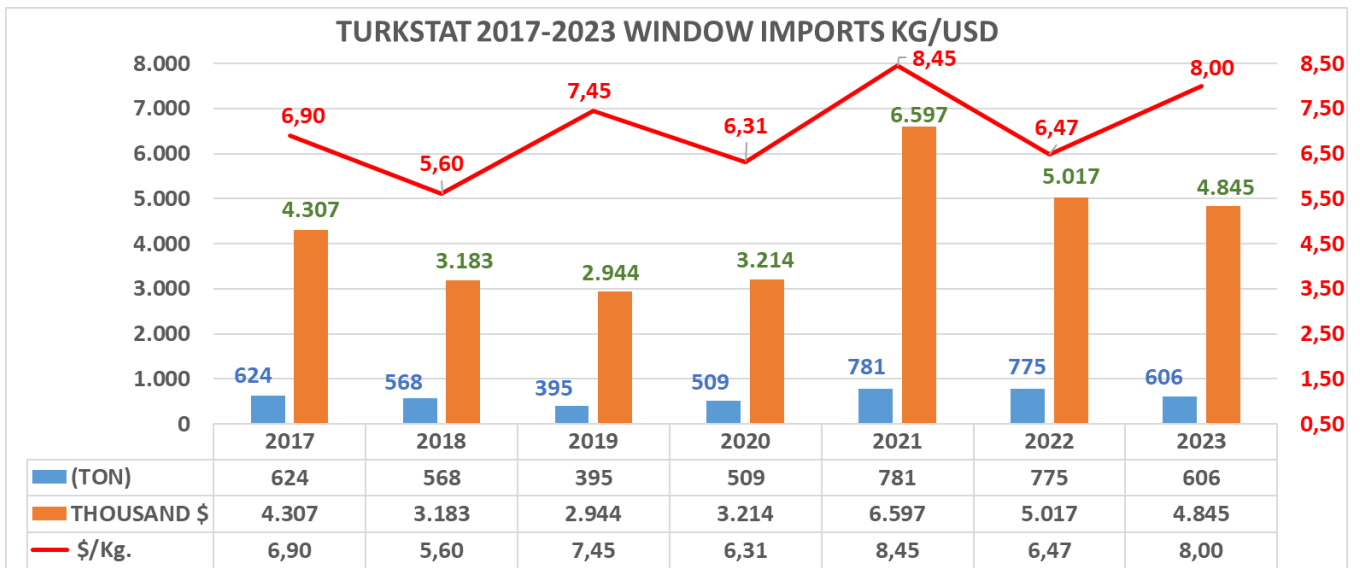
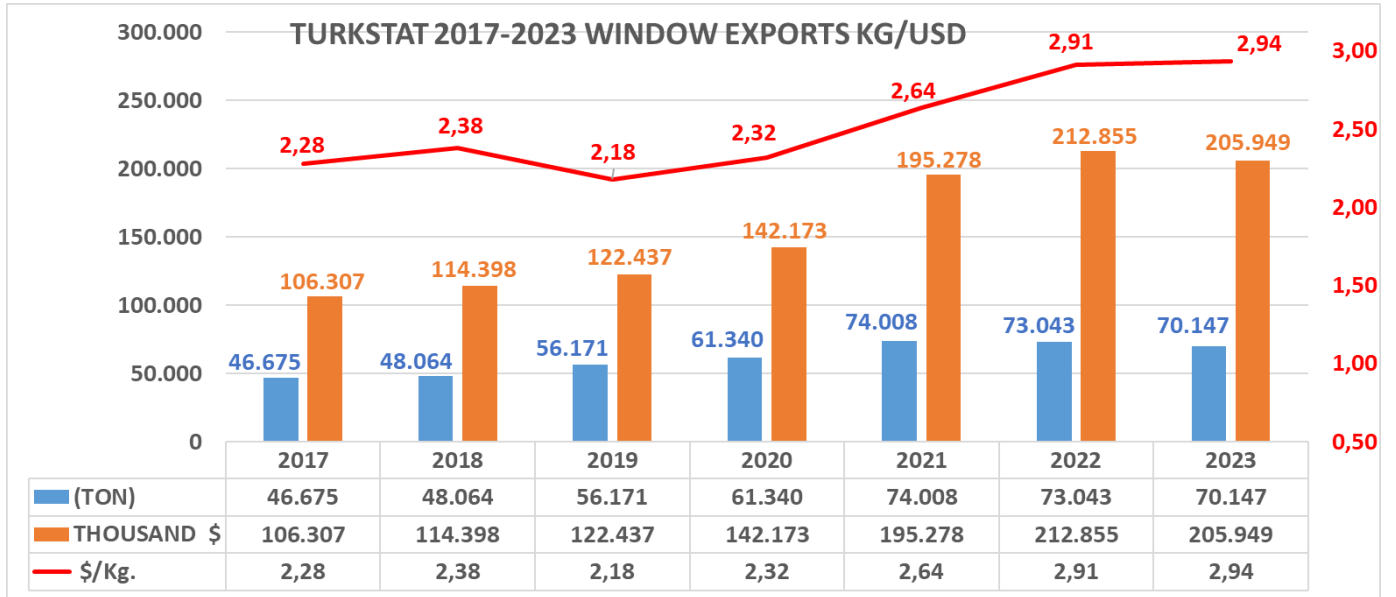


### Turkish domestic market forecasts;

In 2023, in old, new and non-residential buildings;

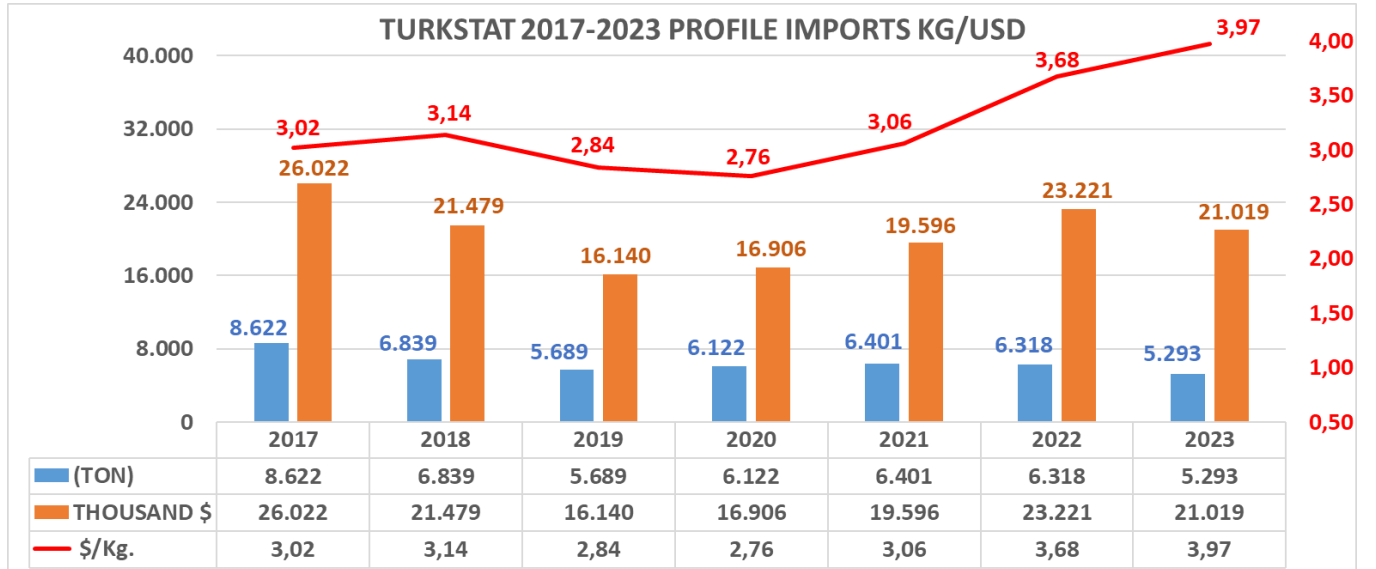
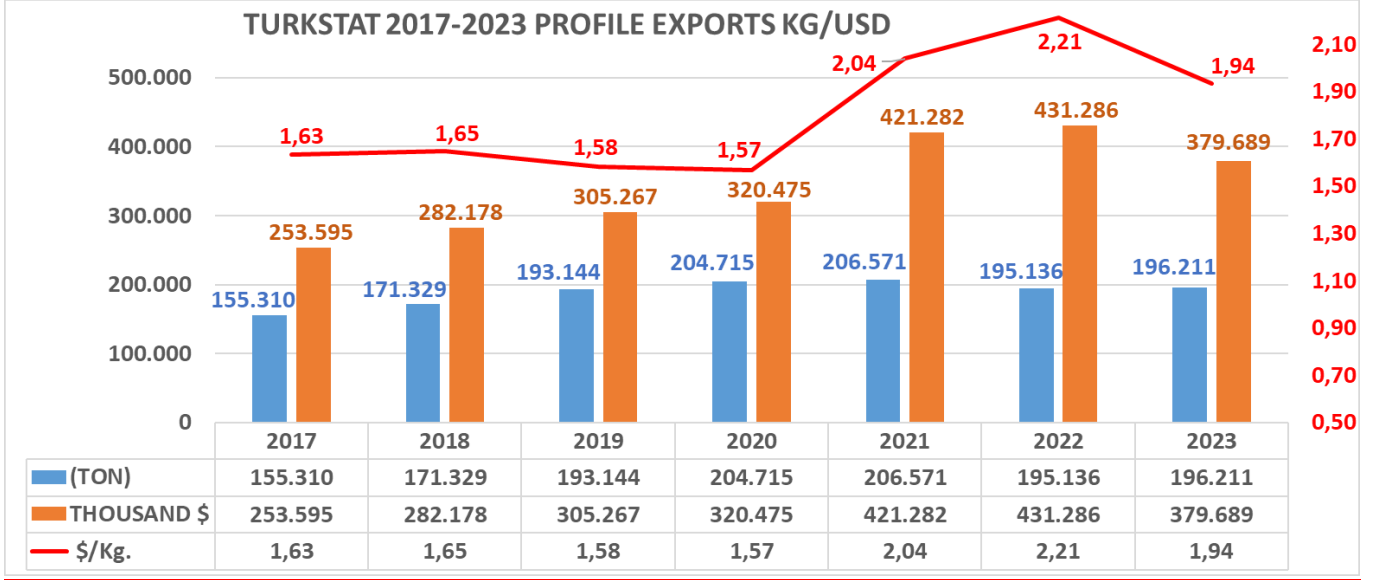
- PVC windows were produced for **1,367,354** residential units and equivalent residential units;
- The end-to-end area of these windows reached **20,510,310** sqm;
- **184,593 tons** of domestic PVC profiles were used for window production .
- **606** tons of ready-made PVC windows were imported.
- **5,293** tons of PVC window profiles were imported.
- We find that **178,694** tons of domestic PVC profiles were produced when we subtract **5,899** tons of total imported profiles and ready-made windows from **184,593** tons of PVC profile used for window production in the domestic market.

### 7-Year PVC ready-made window export and import data;



In 2023, **30,073** tons of ready-made windows were manufactured and exported, in **net** terms, by profile manufacturers and dealers, out of a gross **70,147** tons of profile, whereas **606** tons of ready-made windows were imported.

**7-Year PVC Profile Exports and Imports;**



In 2023, profile manufacturers exported **196,211** tons of PVC profiles, whereas **5,293** tons of PVC profiles were imported.

**2023 Total PVC Profile Production;**

**184,593** tons of PVC profile production, window production - Domestic Market

**35,073** tons of PVC profile production, ready-made window - foreign market (export)

**219,666** tons of PVC window profile production (domestic and foreign market)

**196,211** tons of PVC window profile production - Export

It is known that **415,877** tons of PVC profiles were officially produced in year 2023.

**Usage quantities of door - leaf espagnolettes, handles, etc. in PVC windows in 2023**

**In the domestic market;**

Windows were produced from **184,593** tons of domestic PVC profiles.

**8,887,811** pieces of (leaf-door) espagnolettes-handles were used.

**In the foreign market;**

In windows produced from **35,073** tons of domestic PVC profiles, **1,688,700** pieces of (leaf-door) espagnolettes-handles

In total; **10,576,511** pieces of (leaf-door) espagnolettes-handles

**Glass usage quantities in PVC windows in 2023;**

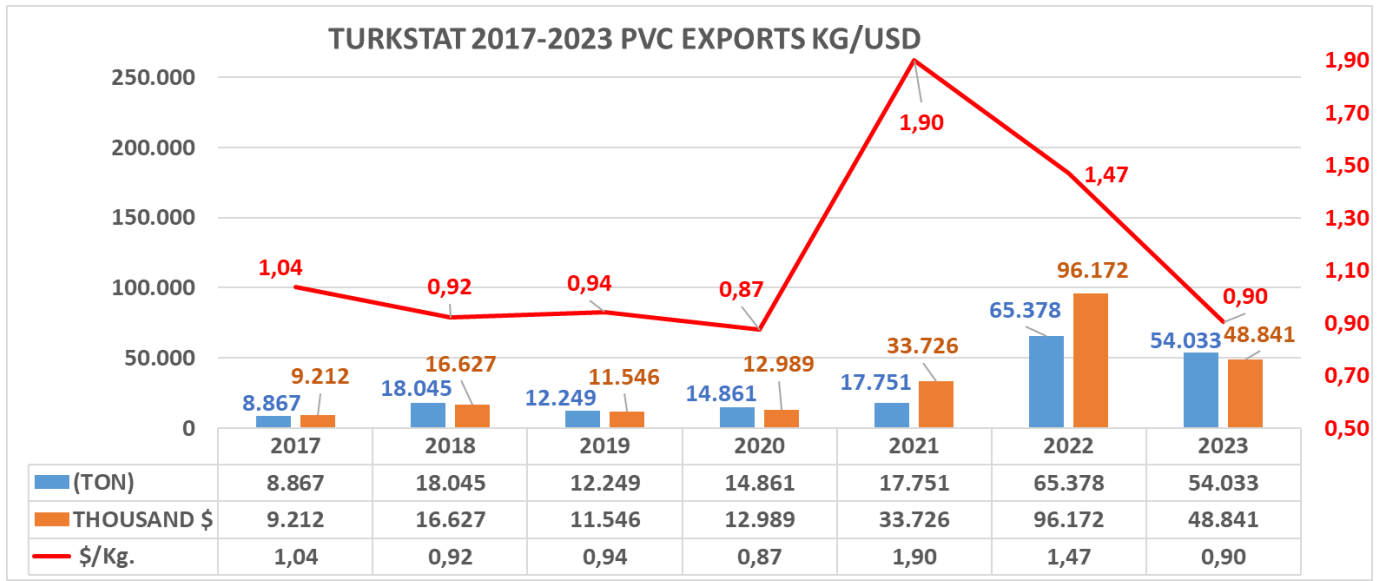
The end-to-end surface of PVC windows produced for **1,367,354** residential units and equivalent residential units is **20,310,510 sqm**.

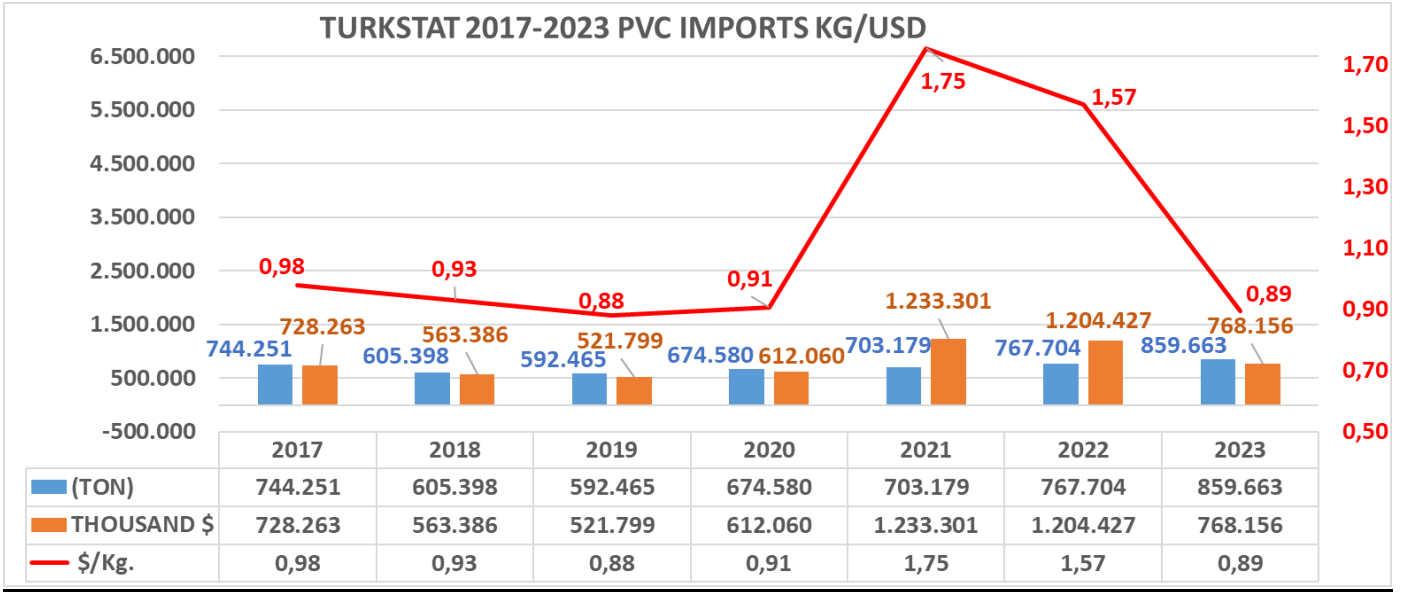
**20,310,510 x 1.75 sqm = 35,893,042 sqm** flat glass (to be converted to double glazing and triple glazing)

**2023 PVC Raw Material Export and Import Data;**

It is estimated that, in 2023, of the **859,663** tons of the PVC imported, **48.4%**, i.e. **415,877** tons, were used in the production of PVC window profiles, whereas the rest was used for the production of products such as construction infrastructure, etc. While part of the PVC required for profile production was supplied from the domestic PVC producers, the majority of it was imported.

**PVC Raw Material Export and Import Data;**





The data contained in this report were calculated using the data sourced from PÜKAD members and the institutions listed in the reference section. The numerous system manufacturers operating in the PVC industry are expected to contribute to this study. The report will be more realistic, particularly if the aluminum window industry provides inputs with data and opinions. It is believed that the revision of this report every year and the elimination of its deficiencies will contribute to the industry and the report will give a more realistic picture with the participation of the aluminum window sector in our association. Part of the information contained herein reflects our estimates.

#### References:

- TURKSTAT statistical data
- Republic of Türkiye, Ministry of Development – Eleventh Development Plan (2019 – 2023) Housing Policies - Expertise Commission Report - Ankara 2018
- Presidency of the Republic of Turkey - Department of Strategy and Budget - 2024 Presidential Annual Program
- AFAD Republic of Turkey Ministry of Interior Disaster and Emergency Management Presidency.
- Special studies of PÜKAD member organizations

We would like extend our thanks to the organizations listed above that have contributed to the production of this study on our industry.