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# **REVITALIZATION OF ABANDONED DUMPSITES PROJECT RESEARCH REPORT**

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## KIRKLARELİ EXCHANGE OF COMMERCE



### REVITALIZATION OF ABANDONED DUMPSITES PROJECT RESEARCH REPORT

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## TEAM'S BACKGROUND

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He completed his undergraduate education in Erciyes University, Department of Business Administration, and his master's degree in Business Administration at Ufuk University, Institute of Social Sciences. He speaks English. In his professional life, between 2000-2004, he worked in Yataş Mobilya A.Ş. in furniture sector, GİSAD Dış Ticaret A.Ş. in finance sector, Koza Tekstil Ltd. Şti. in textile sector, and in the field of civil society, held various positions in the Economists Association and the Yozgat Chamber of Commerce and Industry. Since 2007, he has been specialized in the fields of government support, project management, local development strategies, institutionalization, strategic planning and investment feasibility and provides consultancy in these areas. Hacibebekoğlu, who received the title of Accredited SME Consultant in 2018 with the exam organized by Sakarya University, still provides training, consultancy and research services in these fields to local governments, chambers, exchange markets, non-governmental organizations and SMEs in many regions of Turkey.

He has provided experience of around 2,500 project preparations, executions and coordinations within the framework of national and international grant authorities' SME, social development and small-scale infrastructure programs. He has taken part in 60 research and 120 investment feasibility studies at national and regional level in coordinator, manager, expert and consultant positions, and provided business establishment consultancy to more than 1,000 entrepreneurs.

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In 2014, she participated in the Projects Independent Assessor Training given by the Department of Associations of the Ministry of Internal Affairs and was appointed as an Independent Assessor by the Ministry. In the same year, she worked as a Project Specialist in the Strategy Development and R&D Management / Technology Transfer Office within the İvedik Organized Industrial Zone Directorate for 8 months on state support programs published by institutions such as TÜBİTAK, KOSGEB, TTGV, Development Agency.

Since 2014, she has been working as a Coordinator in Progem Danışmanlık, which provides consultancy services in the fields of research and investment feasibility. In this context, she took part in more than 20 research studies conducted for public institutions and private sector organizations and prepared for 10 different provinces. She has a good command of English.



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Between 2014 and 2016, he started his professional career in various positions in the banking and insurance sectors, and continued with accounting and finance positions in the logistics and real estate sectors. His IAFA internship process is still ongoing and he has SPF Level 3, SPF Derivative Instruments and Corporate Governance Rating Licenses. Since 2020, he has been working as an Investment Specialist at Progem Danışmanlık, which provides research, feasibility, training and consultancy services for the needs of private sector, non-governmental organizations and public institutions across Turkey. His foreign language is English.



## EXECUTIVE SUMMARY

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Environmental pollution increases in the world with the industrialization and development of technology. In addition to this, increase in population and urbanization cause negative effects on the environment. Today, consumption is in the forefront. In line with this, products used are discarded and new products are purchased. This increases wastage and environmental pollution.

Solid waste management in Turkey is one of the major problems experienced in cities and, when solid wastes are not managed properly, they create significant environmental problems. Solid waste management varies according to the characteristics of countries. Solid waste management in Turkey is carried out by municipalities within the scope of local authorities. In solid waste management, most cities experience various problems and these problems are the ineffectiveness of existing regulations in solid waste management, lack of information related to planning and financial limitations.

When the solid wastes are not disposed of properly in terms of techics and health, they cause air, water and soil pollution. In line with this, in the disposal of solid wastes, methods that will cause the least harm to the environment must be used. The amount of solid waste is increasing day by day with the increase in population, technological development, industry and urbanization. For this reason, the recycling of waste is important in preventing environmental pollution and conscious use of resources. Recycling of waste positively affects the environment and economy.

Various studies are being conducted in the world on waste management and recycling. Especially, the sensitivity of developed countries are high towards the environment. Studies indicate that important studies are conducted and investments are made for the disposal and recycling of wastes in these countries. In line with this, examples for these studies and investments are included in the report. Statistics of Turkey and other countries on waste management are also included.

Important studies on waste management and reecycling are conducted in Turkey, especially in recent years. These studies include applications such as Zero Waste Project, incentive application on recycling investments, plastic bags being paid. The details of the projects and policies applied in Turkey are addressed in the report.

With this study, 500 persons from 50 villages in Kırklareli province were taken as sample and with the investigation of the needs and awareness related to the protection of nature in rural area, it is provided that good practices for the prevention of illegal dumping and their effects on business development and commercial life are examined.

Adnan HACIBEBEKOĞLU

General Manager

Progem Eğitim Danışmanlık Ltd. Şti



## CONTENTS

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<b>TEAM’S BACKGROUND.....</b>	<b>4</b>
<b>EXECUTIVE SUMMARY.....</b>	<b>6</b>
<b>CONTENTS.....</b>	<b>7</b>
<b>DEFINITIONS AND ABBREVIATIONS .....</b>	<b>11</b>
<b>1 DEFINITION AND SCOPE OF THE PROJECT .....</b>	<b>12</b>
1.1 Definition and Scope of the Project .....	12
1.1.1 Definition of the Project.....	12
1.1.2 Scope of the Project.....	16
1.1.3 Target Audience of the Project.....	16
<b>2 COMPLIANCE OF THE PROJECT WITH THE LEGISLATION .....</b>	<b>18</b>
2.1 The Place and Importance of the Project in European Union Legislation .....	18
2.1.1 Europe 2020 Strategy .....	20
2.1.2 Basic Principles of the European Union Environmental Policy.....	21
2.1.3 European Union Environmental Action Plans .....	23
2.2 Compliance of the Project with National Policy Documents.....	30
2.2.1 Sectoral or Regional Policies and Programs .....	35
<b>3 GOOD PRACTICES EXAMPLES .....</b>	<b>38</b>
3.1 Current Situation in the World and Good Practices .....	38
3.1.1 Current Situation in the World .....	38
3.1.2 Good Practice Examples .....	39
3.2 Current Situation and Good Practices in the Member States of the European Union.....	43
3.2.1 Current Situation .....	43
3.2.2 Good Practices Examples.....	55
3.3 Current Situation in Turkey and Good Practices Examples .....	58
3.3.1 Current Situation .....	58
3.3.2 Good Practices Examples.....	59
3.4 Current Situation in Kirkklareli Province .....	60
3.4.1 Kirkklareli Geography.....	60
3.4.2 Population.....	61
3.4.3 Environmental Pollution.....	62
3.4.4 Waste Potential That Can Be Used In The Region .....	71
<b>4 ANALYSIS OF RISKS AND THREATS .....</b>	<b>75</b>





4.1	Analysis of Risks and Threats .....	75
4.1.1	Effects on Social Life .....	75
4.1.2	Effects on Commercial Life .....	78
4.2	Precaution Analysis.....	80
<b>5</b>	<b>RESEARCH AND OBSERVATIONAL STUDY .....</b>	<b>85</b>
5.1	Scope of the Research Study .....	85
5.2	Method of the Research Study .....	85
5.3	Analysis of the Research Data .....	85
5.4	Result of the Research.....	92
<b>6</b>	<b>EFFECT ANALYSIS.....</b>	<b>93</b>
6.1	Effect Analysis of the Research .....	93
<b>7</b>	<b>CONCLUSION AND RECOMMENDATIONS .....</b>	<b>94</b>
<b>8</b>	<b>ANNEXES.....</b>	<b>97</b>
<b>9</b>	<b>REFERENCES .....</b>	<b>98</b>





## TABLES

Table 1 - Summary of Past Trends, Views and Expectations to Meet Policy Goals / Objectives .....	29
Table 2- Legislation Regarding Solid Waste Management in Turkey .....	32
Table 3- National Waste Management and Action Plan 2023 Targets .....	36
Table 4- Targets Stated in the 11th Development Plan.....	37
Table 5- Source of Waste from Reuse Organizations .....	41
Table 6- Domestic Bulk Waste Categories .....	42
Table 7- Bulky Wastes in Selected Areas .....	43
Table 8- European Countries Total Amount of Waste by Years.....	44
Table 9- European Countries Domestic Waste Amount by Years .....	45
Table 10- European Countries Textile Waste Amount by Years .....	46
Table 11- European Countries Wood Waste by Years.....	47
Table 12- European Countries Plastic Waste Amount by Years.....	48
Table 13- European Countries Paper and Cardboard Waste Amount by Years.....	49
Table 14- European Countries Recyclable Waste Amount by Years.....	50
Table 15- European Countries Ferrous Metal Waste Amount by Years.....	51
Table 16- European Countries Non-Ferrous Metal Waste Amount by Years.....	52
Table 17- European Countries Ferrous and Non-Ferrous Metal Waste Amount by Years.....	53
Table 18- Solid Waste Characterization Item Groups.....	58
Table 19- Amount of Waste According to Turkey's Waste Disposal Method .....	58
Table 20- Kırklareli Population Data (2007-2019) .....	61
Table 21- Gradual Reduction in Limit Values and Warning Thresholds in Air Quality Assessment and Management.....	62
Table 22- Comparison of Air Quality Index for Air Quality .....	63
Table 23- Continuous Emission Measurement Systems in Kırklareli Province as of 2019.....	64
Table 24- Air Quality Measurement Station Locations and Measured Parameters in Kırklareli Province in 2019.....	64
Table 25- Kırklareli Air Quality Monitoring Station, 2019 Air Quality Parameters Monthly Average Values and Number of Days When Limit Value Exceeded in Kırklareli Province .....	65
Table 26- Pollution Causes of Streams in Kırklareli Province.....	66
Table 27- Solid Waste Components Collected by Provincial / District Municipalities in Kırklareli Province for 2018.....	66
Table 28- Amount of Municipal Waste Collected by Provincial / District Municipalities and Managed by Local Governments (Metropolitan Municipality / Municipalities / Unions) in Kırklareli Province for 2019 and Methods of Collection, Moving and Disposal (KIRK-KAB, 2020) .....	68
Table 29- The Amount of Waste Collected Under Zero Waste Management in 2019 (Central District) .....	69
Table 30- The Amount of Waste Collected Under Zero Waste Management in 2019 (Lüleburgaz) .	69
Table 31- The Amount of Waste Collected Under Zero Waste Management in 2019 (Pınarhisar) ...	69
Table 32- The Amount of Waste Collected Under Zero Waste Management in 2019 (Vize) .....	70
Table 33- Waste Processing and Amount in 2018 in Kırklareli Province* .....	70
Table 34- Animal Waste Biogas Potential .....	71
Table 35: Urban Waste Electricity Generation Potential .....	71
Table 36 - Agricultural Waste Electricity Generation Potential .....	71



Table 37 - Animal Numbers in Kırklareli Province in 2018 .....	72
Tablo 38 - Waste amounts and biogas production calculated according to 2018 data in districts of Kırklareli province .....	73
Tablo 39 - Biogas-based electricity installed powers calculated according to 2018 data in districts of Kırklareli province .....	73

## FIGURES

Figure 1- Garbage Storage Area.....	12
Figure 2- The Amount of Waste Produced in the World and Forecasts for the Future.....	13
Figure 3- Disposal Statistics of EU Municipal Wastes by 1995-2017 (kg / person).....	14
Figure 4- General Composition Breakdown .....	14
Figure 5 - Turkey Waste Characterization .....	15
Figure 6 - Percentage Distribution of Municipal Waste Amounts on Regional Basis .....	15
Figure 7- 2017 Waste Density Map .....	15
Figure 8- Waste Hierarchy .....	31
Figure 9- Estimated Waste Generation by Regions .....	38
Figure 10- Waste Collection Rates by Income Level.....	38
Figure 11- Categories of Domestic Bulky Waste Flows .....	42
Figure 12- Number of Reuse Centers and Reuse Stores (1995 - 2017) .....	55
Figure 13- Kırklareli Province Map .....	61
Figure 14- Kırklareli Population Data (2007-2019).....	62
Figure 15 – Rate of Liking the Village Inhabited .....	85
Figure 16 - Village People's Perspective on the Garbage Problem .....	86
Figure 17 - Solutions to the Garbage Problem .....	86
Figure 18 - Choice of Domestic Waste Disposal Method.....	87
Figure 19 - Reasons for Not Using the Garbage Container .....	87
Figure 20 - Waste Separation Rate During Disposal .....	88
Figure 21 – Rate of Littering.....	89
Figure 22 - The most common types of garbage in the village .....	89
Figure 23 - Response to Littering.....	90
Figure 24 – Rate of Complaint for the Damages Given to the Environment .....	91
Figure 25 - Rate of Presence of Garbage Collection Areas in Villages .....	91



## DEFINITIONS AND ABBREVIATIONS

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EU: European Union  
USA: United States of America  
A.Ş.: Incorporated Company  
EPDK: Energy Market Regulatory Authority  
HKDYY: Air Quality Assessment and Management Regulation  
KÖİ: Public Private Sector Cooperation  
OECD: Organisation for Economic Co-operation and Development  
OSB: Organized Industrial Zone  
PTT: General Directorate of Post and Telegraph Organization  
TARE: Tulsa Authority for Recovery of Energy  
T.R.: Republic of Turkey  
TSE: Turkish Standards Institute  
TÜBİTAK: The Scientific and Technological Research Council of Turkey  
TÜİK: Turkish Statistical Institute  
UATF: National Waste Transportation Form  
EEA: European Environment Agency  
ÇEP: Environmental Action Plan  
ÇED: Environmental Impact Assessment  
EDİKAB: Edirne Solid Waste Association  
SME: Small and Medium-Sized Businesses  
R&D: Research and Development  
EEA: European Environment Agency  
RES: Renewable Energy Sources  
COD: Chemical Oxygen Demand  
MW: Megawatt  
GWh: Gigawatt Hour  
Kcal: Kilo Calorie  
Gcal: Giga Calorie

## 1 DEFINITION AND SCOPE OF THE PROJECT

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### 1.1 Definition and Scope of the Project

#### 1.1.1 Definition of the Project

The project aims to address universal issues such as raising public awareness and building an environmentally sensitive society for the sustainable use of natural resources in the region and in both countries. The main activities of the project focus on researching the needs and awareness for the protection of natural life in rural areas, detecting illegal waste disposal areas, developing the study "Best practices for the prevention of illegal dumpsites and their effects on business development". Within the scope of the project, ecology workshops will be organized in Kırklareli, activities related to revitalization such as disinfection and afforestation of dumpsites will be carried out. As a result of the application of the project, capacity will be developed with cross-border cooperation activities for protection and sustainable use of the nature and management of common natural resources.

Waste is defined as all kinds of materials that are created as a result of any activity, thrown into or abandoned in the environment, while waste management refers to the prevention of waste formation, reduction at its source, reuse, separation according to its characteristics and type, accumulation, collection, temporary storage, transportation, interim storage, recycling, recovery including energy recovery, disposal, monitoring, control and inspection after disposal processes. Wastes are classified depending on factors such as consumption, production, chemical and physical properties. Accordingly, wastes are divided into three; solid, liquid and gas. Solid wastes are classified as domestic solid wastes, hazardous wastes, industrial wastes, agricultural wastes, garden wastes, medical wastes, construction wastes and bulky wastes.

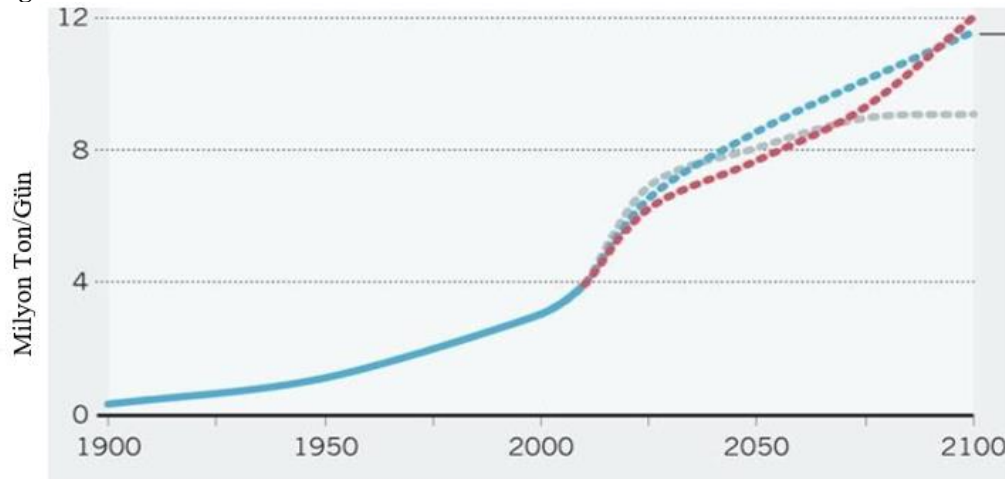
With population, technology, industrialization and urbanization, resources are used unconsciously, consumption and waste generation increase. For this reason, the waste problem in the world is increasing day by day, and human health and the environment are negatively affected. This makes recycling, recovery and reuse of wastes mandatory.

**Figure 1- Garbage Storage Area**



Waste management and recycling is very common and effective in developed countries. Waste management in Turkey is not yet at the desired level. According to the data of the Organization of Economic Cooperation and Development (OECD), 65% of the waste is separated and recycled in Germany. South Korea recycles 59% of its waste. In the USA, 35% of the waste is used through recycling. 99% of waste in Turkey are buried in landfills. Austria, Belgium, Switzerland, the Netherlands and Sweden recycle approximately 50% of their waste. Germany is well developed in the field of recycling. With the regulation in which the principal approach is effective, the fact that the garbage and recycling bins are in accessible places such as bus stops, train stations, schools, parks, city centers, stadiums, and the establishment of mechanisms for this in the city, training studies and legal regulations can be listed among the reasons. This has contributed to the formation of the recycling sector in developed countries, the establishment of various companies and thus the increase in employment. These companies carry out processes such as waste collection, separation, recycling, etc. Minato Recycling Center in Tokyo, Japan, AEB Waste Company in Amsterdam, the capital of the Netherlands, Solo Resource Recovery in Australia are among the recycling facilities in the world. Minato Recycling Center recycles plastic. AEB Waste Company provides the recycling of household electronic waste. The amount of waste produced in the world and the future waste amount estimates are given in the figure below. Accordingly, the amount of waste increases every year.

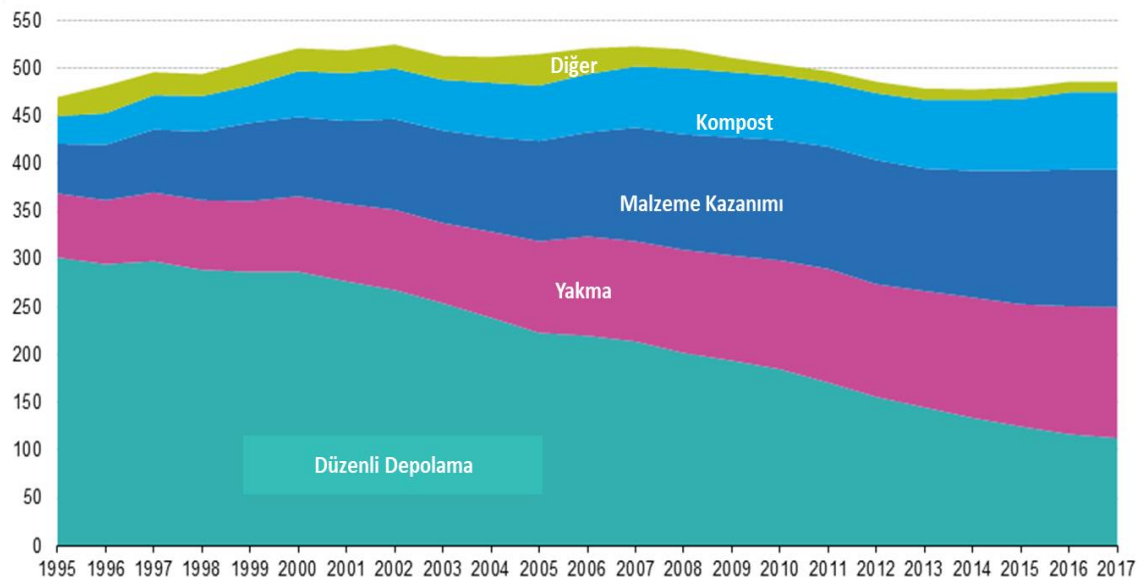
**Figure 2- The Amount of Waste Produced in the World and Forecasts for the Future**



**Reference: Waste Management Practices in the World, 2017**

In the comparison of 2017 and 2025, it was concluded that industrial and hazardous wastes are the most profitable type of waste in the global waste management market (Allied Market Research.com). In this direction, facilities are established to ensure the recycling and recovery of municipal waste. These facilities are particularly common in European countries. As seen in Figure 3, there is a tendency to decrease in landfill and increase in material recovery in the disposal of municipal waste in EU countries.

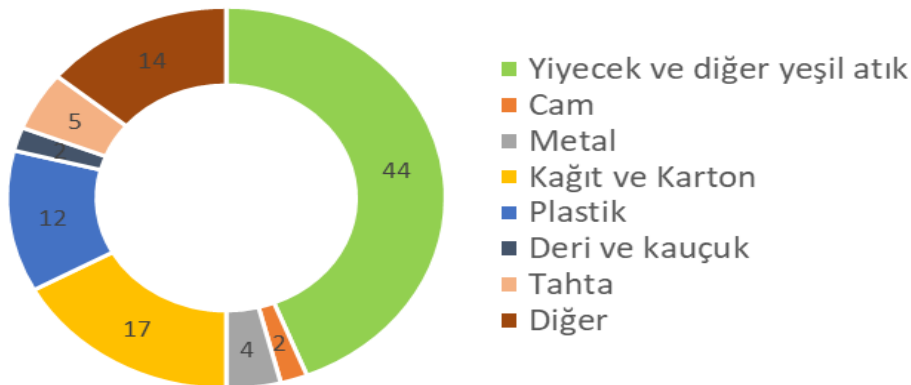
**Figure 3- Disposal Statistics of EU Municipal Wastes According to 1995-2017 (kg / person)**



**Reference: Eurostat, 2020.**

Waste composition is important in waste recycling. The general composition (Figure 4) in the World Bank's What a Waste 2.0 report varies according to the income levels of the countries, while high-income countries produce less food waste (around 32%), they produce more dry waste, and in middle and low-income countries, food based waste amount is approximately 50%.

**Figure 4- General Composition Breakdown**

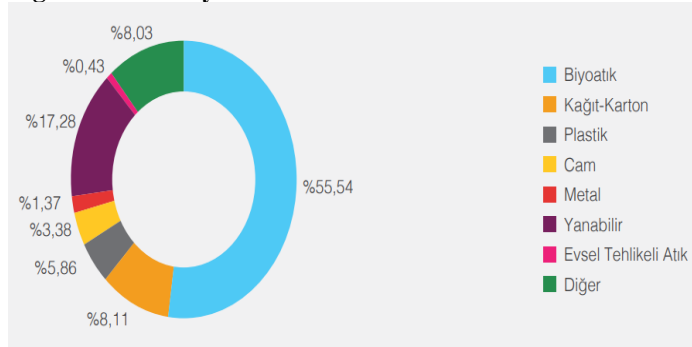


**Reference: World Bank, 2020.**

The composition of waste in Turkey is quite similar to the world. Turkey's waste characterization is given in Figure 5. Accordingly, biowaste rate in Turkey is 55,54 %. The most common waste after biowaste is combustible waste with 17.28%.



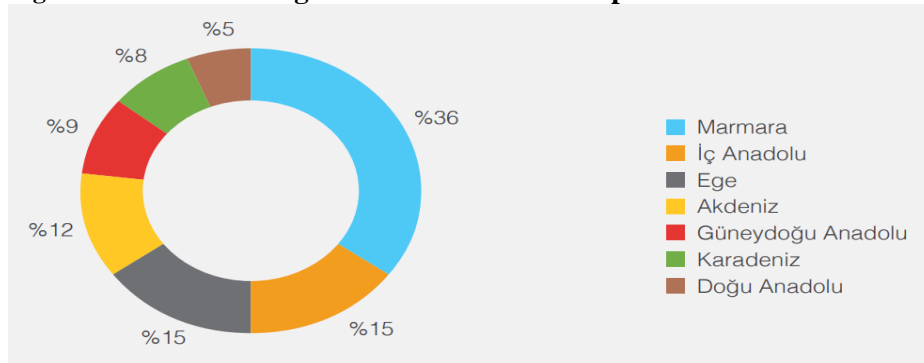
**Figure 5 – Turkey’s Waste Characterization**



Reference: T.R. Ministry of Environment and Urbanization, 2017

In Figure 6, the percentage distribution of municipal waste amounts on regional basis is given. Accordingly, the Marmara Region, where Kırklareli province is located, is the region with the highest amount of waste.

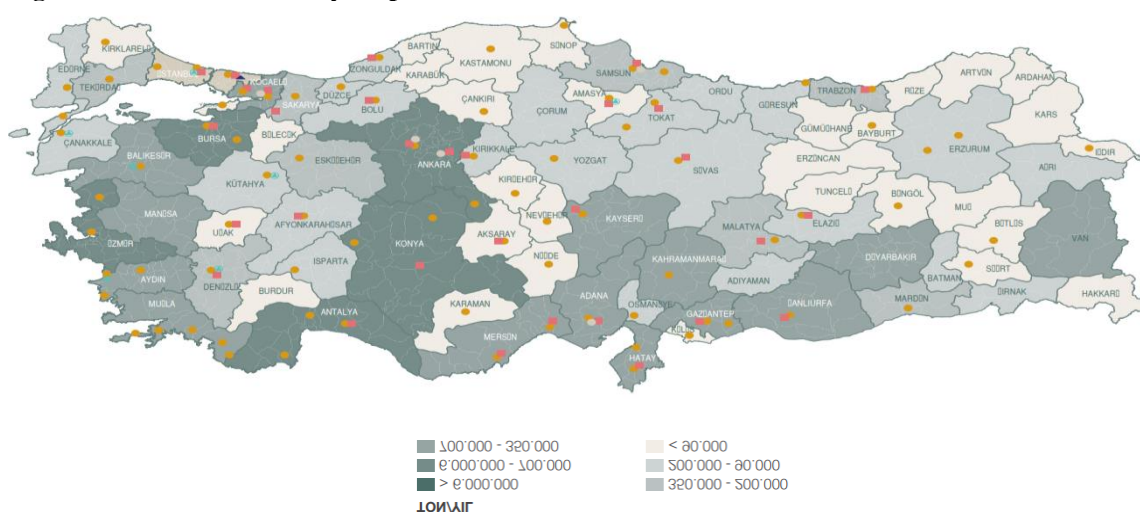
**Figure 6 - The Percentage Distribution of Municipal Waste Amounts on Regional Basis**



Reference: T.R. Ministry of Environment and Urbanization, 2017

The figure gives a waste density map according to the amount of waste in 2016.

**Figure 7- 2017 Waste Density Map**



Reference: T.R. Ministry of Environment and Urbanization, 2019





### **1.1.2 Scope of the Project**

With the survey conducted in the region within the scope of the project, it was aimed to investigate the needs and awareness of the population regarding the protection of nature in rural areas. In line with this, a research was conducted among the people living in 50 villages of Kırklareli. In addition, detailed and in-depth information has been provided on the current and valid best practices at the European Union (EU) level to prevent illegal dumping. For this purpose, as a result of the study, different policies, laws and regulations regarding the prevention of illegal dumping have been put forward. In addition, the negative effects of illegal dumping on business development, commercial life and investments in the region, as well as the positive effects of current best practices to eliminate or reduce this problem, on this situation were also discussed. Therefore, the following topics were evaluated with the study:

- Regional analysis
- Risk and danger analysis
- Studies on specified areas
- Social, economic and environmental factors predicted to be affected in the region
- Literature research and sample applications
- National and international sectoral policies and strategies
- Best practices for business development and its impact on business life

### **1.1.3 Target Audience of the Project**

The target audience of the project is divided into two; the people of the region and the companies operating in the region. Kırklareli province, which is the application area of the project, is located in the Thrace region. The region's population growth rate remained below Turkey's average until the 2000s. After the 2000s, the population growth rate of the region has exceeded Turkey's average.

While 356,050 people lived in Kırklareli in 2017 according to the results of the address-based population registration system, it is estimated that this figure will reach 374,715 with an average increase of 8.5% in 2023 (TÜİK, 2018). 102,534 people, which is the 28% of the population of Kırklareli, which was 361,836 as of 2019, live in town villages (TÜİK, 2019). Turkey average of the same rate is 7%. As can be seen, a remarkable part of the population of Kırklareli lives in settlements outside the city. The mass selected as the target audience of the project corresponds to a significant portion of the population of the province.

When the entire Thrace region is considered, it stands out as a region that receives high rates of immigration. Regardless of this situation, the net immigration figures of Kırklareli province are close to zero due to the fact that the generally received and sent immigration figures are close to each other. Considering that more than half of the planned industrial areas in the region are currently empty, net immigration figures are expected to increase with the developments in the manufacturing industry (Trakyaka, 2017).

Kırklareli is in a location that has a developed transportation infrastructure at the Bulgarian border. It is among the leading provinces of our country in terms of international road connections, highways and divided road lengths per km<sup>2</sup>. The province, due to its strategic location, is a transition corridor



between Europe and Asia. Due to its location, it has easy access to both the Istanbul market and to Europe with its Dereköy Border Gate.

Thrace region, including Kırklareli, is among the rapidly rising regions of Turkey in terms of industrial development. Although industrial facilities are concentrated on the D-100 highway passing through Çorlu, Çerkezköy, Lüleburgaz line, Kırklareli has not yet achieved a progress as Tekirdağ in attracting industrial investments.

According to the 81 provinces status report of T.R. Ministry of Industry and Technology, among the total industrial businesses, Kırklareli is among the provinces that has a developing industry with a rate of 0,4%, respectively. According to industry registry records, there are approximately 300 enterprises and around 21,000 SMEs. When the sectoral distribution is examined according to the industrial registry records, the food, drink and tobacco industry has the highest share with a share of 33%. Forest products and furniture with a share of 19%, textiles, clothing and leather industry with a share of 15%, respectively, are other important sectors in the province (Trakyaka, 2017).

Kırklareli, which falls behind in terms of industrial investments compared to the general of the region, is open to new industrial investments in the upcoming period due to the lack of sufficient space and resources, especially after the rapid industrialization in Istanbul and Tekirdağ provinces. With this situation, it is highly possible for the region to experience immigration. The harmful effects of the facilities currently established in the region on the natural resources of the Ergene basin are known.

When the resources and possibilities of the region are considered, issues such as milk and dairy facilities, agriculture-based industrial investments, biogas investments stand out. Kırklareli, as of now, is not an industrialized province. It stands out as a new place for investments, considering the other important industrial focuses in the Thrace region where it is located. Especially considering the damages caused by the industrial investments made in Çorlu and Çerkezköy surroundings to the natural resources in the region, it is important to establish an adequate infrastructure.

The wastes generated by agricultural and animal production in Kırklareli have the potential for a different industrial investment. The important agricultural products in Kırklareli province are wheat, sunflower and paddy. Industrial plants such as sugar beet, tobacco and thyme are produced in the province. Approximately 50% of the animal production in the province takes place in the form of poultry. Ovine breeding and bovine breeding follow, respectively. Kırklareli carries out 30% of the milk production in the region.

There is a good chance of success of a project that will be developed in accordance with the needs of the people of the region and the industrial organizations operating in the region. Given the industrial facilities of a city such as Istanbul, which is a world metropolis, in the region and its surroundings, it will be possible to provide employment in the region with a project that can neutralize the environmental impact of established facilities. The high level of transportation facilities of the region makes it easy to get the necessary materials both within the region and from Istanbul to the region.

Considering the rural population of the region and the industry based on agricultural production, the investment portfolio with high sectoral harmony has a high chance of success. In the established OIZs, making the investment attractive and establishing an environmentally sensitive industrial formation stand out as important points. Considering the damage caused by the industrial facilities established in the region to the environment, it is expected that this issue will come up more in the coming period.



## **2 COMPLIANCE OF THE PROJECT WITH THE LEGISLATION**

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### **2.1 The Place and Importance of the Project in European Union Legislation**

The presence of environmental policies in the European Union started to be felt towards the end of the 1970s as a result of the intensive use of natural resources with increasing industrialization and their negative effects on the environment. The fact that the environmental problem is a global problem has prepared the ground for the union to develop a common policy on the environment. The European Union included the environment in its administrative policies after the Stockholm Conference in 1972. The conference called for the creation of an environmental action plan, and the EU did not remain indifferent to the call and prepared the First and Second Environmental Action Programmes. These programmes formed the basis of EU environmental policies.

The fact that the environmental problem is a global problem has prepared the ground for the union to develop a common policy on the environment. In addition, a common environmental policy should be created for different environmental policies applied in the member countries to be reflected to the product costs and quality standards, the competition of different reflection of the investments made by the member countries on the costs in the prevention of environmental pollution negatively affecting the free movement of goods, and, economic, social and political free competition and circulation.

The formation of EU environmental legislation is based on the Directive on Classification, Packaging and Labeling of Hazardous Substances, which entered into force in 1967. Environmental policies made in this period can be described as secondary policies addressed in economic policies. Environmental policies' becoming the primary policy realized with the Single European Act, which entered into force in 1987, and they were included in the founding treaty of the union for the first time by opening a separate chapter on Environment. With the Single European Act, the Treaty of Rome, which is the establishment agreement on environment and health issues, has been amended in a way to cover the environment for the establishment purpose of the community.

The objectives of the EU, which is called the European Community of the period with the Single Act, are to protect and improve the environmental quality, to contribute to the protection of human health and to ensure the rational use of natural resources by taking into account their future. In addition to this situation, the principle of polluter pays was underlined with the amendment made in the 130th article of the Treaty of Rome, and the legislative capacity of the Community and the principles of environmental policy were included with the amendment made to the 174th article.

With the Maastricht Treaty signed in 1992, arrangements were made in the founding agreement. Amendments made with the agreement, also known as the Treaty of European Union, which entered into force in 1993, are as follows;

- Harmonious and balanced development of economic activities and sustainable and non-inflationary growth that respects the environment (Article 2).
- With this article, it is the precursor of sustainable development policy.
- Inclusion of environmental policy by the community activities (Article 3).



- Environmental policy is towards protection and depend on preventive principles (Article 130r).
- Ensuring the integration of environmental protection policies with other policies of the Community (Article 130r).
- Adoption of the local “conformity” principle (Article 3b) and the goal of ensuring that decisions are taken at the closest level to citizens (Article A) (Özçelik & Barut, 2017).

In 2000, the European Union introduced the Lisbon Strategy, based on the idea that the aim of realizing and ensuring the continuity of economic development will be possible by introducing innovations and adapting to technological breakthroughs. According to the aforementioned strategy, more emphasis should be placed on R&D activities, quality employment based on technological development should be increased, and sustainable growth is aimed by enabling social cohesion. It has been stated that human beings should be at the center of policies and active welfare state is possible with investment in people.

In line with the purposes stated above, sustainable development goals have been announced by European Council in Strasburg. Accordingly, increasing the production capacity of electricity from renewable sources to 22% in 2010, prioritizing services and methods that will not harm the environment in transportation and infrastructure, struggling with situations such as traffic density, environment and noise pollution, efficient use of natural resources, informing the citizens of member and candidate countries on issues such as the recovery of wastes generated by economic growth, Reducing greenhouse gas emissions concretely until 2005 and reducing biodiversity losses to zero by 2010 have been aimed.

The creation process of the European Union environmental policy has continued in line with the primary and secondary policies of the Union and has gradually increased with the legislative arrangements and new legislations on the environmental acquis. EU legislation covers legal arrangements such as decisions, directives, regulations, recommendations. The EU forms an important part of its environmental policy through directives. Directives are prepared by considering the different environmental and economic conditions of the environment for the member countries, which is a global and national problem, and are arranged flexibly as to take into account the different legal structures of the member countries.

The main application areas of the EU environmental policy are listed as waste management, protection of air and water quality, chemicals, genetically modified organisms, nuclear safety and radiation protection, industrial pollution control and risk management, noise pollution management, protection of natural life and climate change. Many directives have been put into force regarding these application areas. The collection and evaluation of environmental information, which is defined as horizontal legislation, the right to access information and participate in decision-making processes, environmental impact assessment are handled within the framework of strategic environmental assessment (Talu, 2001).

The aim of the Solid Waste Framework Directive is to create a basic approach to waste management in the Union, to ensure that member states create a waste management plan based on this directive. The directive directly describes the concept of waste, delivers waste terminology and provide a list of waste types. The main responsibilities of member states defined by the directive are (Öztürk, Özabalı, & Tezer, 2010);

- Create or define an authorized institution responsible for implementing the Directive,



- Ensure that the competent authority implements waste management plans that can meet the requirements of the directive,
- Establish adequate and integrated disposal facilities considering the most appropriate technologies and costs,
- Ensure that the polluter pays principle is applied in waste disposal.

The Union's programme on waste management covers reducing waste at source by the development of product designs, recycling and re-use of waste, and reducing pollution resulting from the incineration of waste. The directive does not define targets for minimization, recycling, recovery, re-use or treatment of waste; these directives are determined by other directives called sister directives (Öztürk, Özabalı, & Tezer, 2010).

Besides the Waste Framework Directive, other directives on extracted waste are as follows;

- Council Directive dated 16.06.1975 and numbered 75/439/EEC on Waste Oils
- Council Directive dated 12.06.1986 and numbered 86/278/EEC on Treatment Sludge
- Council Directive dated 13.03.1991 and numbered 91/157/EEC on Accumulators and Batteries
- Council Directive dated 12.12.1991 and numbered 91/689 on Hazardous Wastes
- European Parliament Council Directive dated 20.12.1994 and numbered 94/62/EC on Packaging Waste
- Council Directive dated 26.04.1999 and numbered 91/31/EEC on Regular Landfill
- European Parliament Council Directive dated 18.09.2000 and numbered 2000/53/EEC on Scrap Vehicles
- European Parliament Council Directive dated 27.01.2003 and numbered 2002/96/EC on Waste Electronics and Electrical Equipment.

### **2.1.1 Europe 2020 Strategy**

The European 2020 Strategy consists of three key objectives, described as intelligent, sustainable, inclusive growth, emerged as a result of the failure of the Lisbon Strategic Plan in 2008 due to its impact on the economic and financial crisis, which significantly affected the entire world and also had an impact on Europe.

Within the scope of intelligent growth, it is aimed to transform the EU economy into an economy based on knowledge and innovation. Within the scope of sustainable growth, a more competitive economic goal where resources are used more efficiently, environmental sensitivity is developed has been set. Finally, within the scope of inclusive growth, its transform into an economy with high employment opportunities where EU's regional and social cohesion process is provided.



The European 2020 Strategy has addressed environmental policies under the heading of sustainable growth. The EU is targeted to reach a point where it uses resources more efficiently and avoids waste, economic competition is provided, biodiversity is maintained, and it has low carbon emissions. In addition, the EU's objectives for environmental protection and climate change in the European 2020 Strategy are defined as to reduce greenhouse gas emissions by 20%, to meet energy consumption from renewable energy sources by 20%, to increase energy efficiency by 20%.

The goal of clean and efficient energy, which is aimed to be achieved, is aimed to create economic growth and new employment areas with the reduction of the import of fossil energy resources such as oil and natural gas. The main priority areas in this area have been determined as climate change, competitiveness, clean and efficient energy use.

In the areas of climate change, clean and efficient energy use, with the "Resources Efficient Europe" initiative, a transform into an economy that uses resources efficiently, releases low-carbon emissions is intended. Under this heading, it is aimed to encourage the use of renewable energy resources instead of carbon-based resources for economic growth, and to ensure energy efficiency by renewing the transportation sector by creating a vision for a Europe that has completed its transformation into an energy efficient economy with a low carbon footprint in 2050. In this context, it is targeted to improve the framework conditions for the best use of EU financial instruments and market-based instruments such as emissions trading and energy taxation.

By 2020, environmental policies have evolved as the dimensions and qualities of the challenges encountered in global environmental and climate issues became clearer. Europe's environmental policy framework, i.e. environmental legislation, is shaped by ambitious long-term visions and goals as time goes on. In line with Europe's long-term and complementary policy objectives, it is clear that Europe has not made the desired progress in adequately addressing environmental problems. In the European Environment Agency (EEA) report, "The European Environment - State and Outlook 2020" published in 2019, policies have not been as effective in reducing environmental pressures in protecting biodiversity, ecosystems, human health and wellbeing. EU steps on the issue are expected to yield clearer and more successful results in the coming period.

### **2.1.2 Basic Principles of the European Union Environmental Policy**

EU environmental policy basically adopts the principle of preventing environmental pollution at its source. The basic principles of EU environmental policy are in Article 174/2 of the Treaty of Amsterdam.

#### **2.1.2.1 Polluter Pays Principle**

The polluter pays principle is the principle that requires preventing, controlling, cleaning of the pollution and paying the relevant cost. The main objective of the policy is the allocation and internalization of the cost. It is based on making polluters pay the price for fighting the pollution they cause. In the secondary legal legislation of the EU legislation, the principle of polluter pays has been directly included in the Waste Framework Directive, and it has stipulated that the costs of the waste disposal process is to be paid by the person who caused the waste.





This principle was addressed by the Economic Cooperation and Development Organization in the early 1970s, when environmental problems began to be discussed globally and the search for solutions began, and continued its development by taking part in the decisions taken with many meetings held. The main purpose of the polluter pays principle is to create coordination between countries on the issue of environment and to evaluate the competitive advantages that may arise by applying different policies in environmental protection and to minimize the deviations that may occur in trade flows.

This principle is the cornerstone of the Community environmental policy. With this principle, it is aimed to make polluters pay pollution costs, to encourage interested parties to reduce pollution and to produce products and technologies that are less polluting to nature (Sarıkaya, 2004).

#### **2.1.2.2 Prevention at Source Principle**

The principle, which states that environmental damage should be prevented at its source, is mostly applied in the water and waste sector. Wastes should be disposed of at a place as close to the production location as possible. This principle is about preventing pollution at its source at the earliest possible stage, and it is aimed to prevent the spread of environmental pollution. For example, in the waste sector, in order to limit the amount of waste, the waste should be disposed of at a place as close to the production site as possible.

The environmental policies of the Community are based on the principle that situations that may harm the environment can be prevented at the source. The Community's legislation applies this principle, especially in the waste and water sector where the determined emission standards exceed the determined environmental quality criteria (Sarıkaya, 2004).

#### **2.1.2.3 Cooperation Principle**

The principle of cooperation is one of the important principles that can be effective in preventing pollution in the international arena. The fact that the impact areas of environmental problems are international rather than national requires national and international cooperation and necessary coordination in order to implement environmental policies and be successful. With this principle, local government units and central government should cooperate with representatives in the trade, tourism and industry sectors (Toprak, 2006).

This principle adopts that the state and society should act together in the elimination of environmental problems and everyone should contribute to find the necessary solutions. In particular, it requires public participation in the formulation of policies and in the preparation of relevant legislation and its implementation (Budak, 2004).

#### **2.1.2.4 Complementarity Principle**

This principle is the policy of integrating the environmental protection policy with the other policies of the EU. With the change of environmental policies in the 1980s and 1990s, it was understood that the environment had effects on other policy issues, as well as the effects of other policies of the EU on the environment. This mutual interaction led to the need for a more holistic approach and formed the foundations of the Complementarity principle.





This principle, also called the integration principle, can be handled in two ways: internal integration and external integration. Considering the need to protect the environment in the shaping and execution of other policy areas refers to external integration, and the necessity to consider the effects of any substance or activity on the environment as a whole, not on a specific environmental element, refers to internal integration (Güneş, 2011).

### **2.1.3 European Union Environmental Action Plans**

The environmental policies of the European Union have focused on the problems that exist within the Union for a long time, and afterwards, the necessity to put forward common and harmonious policies on pollution at the international level, which is caused by the characteristics of pollution being both regional and global, has been realized. At the summit held in Paris in 1972, nine member states of the period emphasized the importance of EU environmental policies and demanded the creation of an action plan. The environmental policy put into practice with the First Environmental Action Plan (EAP) prepared in the same year became a Union policy by adding the Single European Act to the Treaty of Rome.

Environmental Action Plans, created and applied by European Commission, were created with the purpose of providing the large-scale combination of tools (regulatory tools, financial tools, horizontal measures, financial support systems) and put forward a vertical sectoral approach (Özçelik & Barut, 2017). Action plans generally gain recognition as Council declaration. From amongst the environmental action plans, prepared for the national and global solutions of environmental problems and of which one covers a period of 4-5 years, six programs were brought into force. Seventh and the last program prepared is in force today.

The seven plans, which have been agreed to date, aim to fight pollution, the integration of environmental issues into all Union activities and to increase public access to official environmental information. Legally non-binding EAPs leave a sufficient amount of activity to member states.

In the steps taken by the European Union regarding the environment, the environmental policy is not comprehensively addressed, but the basic principles on which the environment is based are mentioned. It is beneficial to examine the environmental action plans in order to better understand the EU environmental policies. Environmental action plans set out the basic principles of policies to be followed within the EU and guide the creation of environmental legal literature. Non-binding EAPs have been created in order to implement environmental policies and to serve as a guide for member countries.

#### **2.1.3.1 First Environmental Action Plan**

The First Environmental Action Plan is an indication of the European Union's first major breakthrough in the environmental field and its acceptance as a strategy to achieve its broadly existing goals (Budak, 2004). The main aim of the program is to harmonize and coordinate environmental policies at national level. The plan, which was implemented between 1973 and 1977, allowed the discussion of environmental protection, welfare and economic development, which interact with each other. Within this program, the European Community has created three action categories. These are the prevention



and reduction of situations that cause pollution and noise, improvement of the environment and living conditions, and increasing cooperation with international organizations.

The basic principles in the First Environmental Action Program are as follows;

- Preventing pollution at the source,
- Considering environmental issues in planning and decision-making processes,
- Polluter pays principle,
- Considering the effects of the Community's environmental policy on developing countries,
- Encouraging cooperation at the international level,
- Determination of appropriate activity levels,
- Carrying out training activities for the dissemination and development of environmental awareness,
- Ensuring harmonization and coordination of national programs,
- Putting into effect the environmental awareness processes.

#### **2.1.3.2 Second Environmental Action Plan**

The second environmental action plan was adopted in 1977 and covered the years between 1977 and 1981. The second plan, which is a continuation of the first action plan, underlined the issue of increasing environmental awareness, which was determined in the first plan but could not be implemented, reporting the developments about the environment and the current status, and finally the development of international cooperation.

The priority issue in this plan is to prevent the factors that pollute air and water. For this purpose, Environmental Impact Assessment (EIA) came to the agenda for the first time. The following decisions have emerged in the EU Second Environmental Action Plan:

- Prevention of pollution is a more effective method than disposal after it occurs,
- Polluter pays principle,
- Considering the effects of any activity carried out on the environment,
- Taking environmental actions into consideration at the most appropriate and favorable level.



### **2.1.3.3 Third Environmental Action Plan**

The third environmental action plan is a plan that covers the years between 1982 and 1986 and reflects important changes in the addressing of environmental policies. In the third plan, which has a wider perspective than the first two plans, more general issues were addressed instead of detailed issues, and it was observed that environmental policies adopted a preventive approach (Yaman & Gül, 2018). The protection of resources that are directly effective in determining the quality of life and the improvement of problems by solving them are considered from a wider perspective.

The plan, which is based on elements such as the protection of human health, water, climate, raw materials, air, soil, flora, fauna, artificial environment, cultural heritage, which have a direct impact on the level of life quality, and the protection of resources by improving them, includes general policies by emphasizing the integration of environmental issues with other policies. The plan also prioritized environmental protection in the Mediterranean region, noise pollution from transport, active combat against cross-border pollution, hazardous chemicals, waste management, the promotion of clean technologies, sensitive environmental areas and cooperation with developing countries.

The innovation that the third plan put forward compared to the previous two programs is that environmental policies can have a positive impact on other policy issues. The third EAP mainly focused on prevention, not control of pollution. It has been underlined that environmental activities will be effective in accelerating innovations in industry and creating employment. In the third program, the development of new technologies also took a large place. It has been stated that the implementation of the principle of "Preventing Pollution at the Source" is one of the most effective areas of environmental policies, especially on the environmental pollution dimension.

### **2.1.3.4 Fourth Environmental Action Plan**

The Fourth Environmental Action Plan, approved on October 19, 1987, covers the years 1987-1992. In this plan period, environmental protection was considered as a component of economic and social development and stricter environmental standards were included. These standards include both the general demands and the necessary applications in terms of the activities of the industry in domestic and foreign markets (Özcelik & Barut, 2017).

The most important difference between the Fourth Environmental Action Plan and the previous plans is that it is the first program prepared in the light of the said agreement after the European Single Act, which is one of the most important treaties in the history of the European Community. This program, which defines environmental policies as an element of economic and social development, was created in line with the policies determined by the Single European Act (Aydın & Çamur, 2017).

In the plan, a serious search for balancing is dominant in preventing the negative effects of the agricultural sector on the environment. The plan is also a plan in which measures are taken to prevent pollution when and where it begins, and the costs are taken into account together with the savings effects these measures will provide in future. Another distinctive point that distinguishes the Fourth Environmental Action Plan from the others is the introduction of some national-level financing resources on environmental issues. This plan stands out with its contributions to the strengthening of environmental legislation by integrating environmental policies with other union policies.



### **2.1.3.5 Fifth Environmental Action Plan (Towards Sustainability)**

In the plan prepared within the scope of the basic norms of the European Union Environmental Policy, a general explanation has been made by considering the concept of development as well as the concept of sustainability discussed in the Maastricht Treaty. The plan, covering the years 1993-2000 and named "Towards Sustainability", was published in parallel with the Rio Conference and Agenda 21 declaration. The main objective of the plan is to transform growth within the EU into a sustainable development. In the sustainable development process, it is aimed to apply polluter pays and precautionary principles, which are one of the basic norms of environmental policy, and to spread the awareness of common responsibility.

The plan highlights the environmental impact of five key sectors; transport, tourism, industry, agriculture and energy. The plan also includes the features of effective sustainable development. These features are the maintenance of the quality of life within the general framework, ensuring the continuity of access to natural resources, avoiding permanent damage to the environment, and putting forward a development that will require future generations not to sacrifice the needs of future generations in order to meet the needs of the day (Sarıkaya, 2004).

The plan, which is more comprehensive compared to the previous plans and deals with environmental problems from a wider perspective, focuses on issues such as climate change, destruction and destroying of natural resources, losses encountered as a result of reduction in biological diversity, air pollution and carbon emission, pollution and waste in coastal areas, and destruction of urban areas. This plan also addresses the environmental problems in Central and Eastern Europe.

### **2.1.3.6 Sixth Environmental Action Plan (Our Choice, Our Future)**

The plan, in which the subjects aimed to be reached within a 10-year period covering the years from 2001-2012, were announced under the name of "Environment 2010 - Our Future, Our Choice". During the period when this plan is in effect, the goals and priorities of the environmental policy, the measures that the EU should take in environmental issues for an effective sustainable development have been aimed. The Sixth Environmental Action Plan mainly focused on ensuring the implementation of Environmental Law at high rates by the EU member countries and the approval of the full integration of environmental principles and political objectives by EU member states.

There are four priority issues in the Sixth Environmental Action Plan. These are;

- The studies carried out to achieve the targets of the Kyoto Protocol as soon as possible and release of greenhouse gases due to climate change and the use of fossil fuels causing global warming, thus taking the necessary measures to reduce the greenhouse gas emission rate by 8% between 2008 and 2012,
- Protection of biological diversity as so the main focus is on the prevention and management of major disasters (nuclear disasters, etc.) containing hazardous substances and basing the practices on Natura 2000 Network,



- To prevent air, water and noise pollution that has been found to have negative effects on human health, and to establish and strengthen the relationship between environment and health, which aims to prevent human health from being threatened and an environment free from adverse effects,
- Providing recycling by preserving natural resources, separating waste and garbage at the source, sustainable management of solid wastes and natural resources.

It can be said that the sixth Environmental Action Plan was built on the principles adopted in its predecessors. It is seen that the plan is in compliance with the Fifth Environmental Action Plan, and the improvement of the legislation in force, the establishment of a working ground close to the market, the integration of environmental requirements with other policies, planning of land use and taking into account the environmental issue in administrative processes appear as the priority issues. The plan deals with environmental problems at a global scale from a broader perspective (Duru, 2007).

#### **2.1.3.7 Seventh Environmental Action Plan (Living Better Within the Limits of the Planet)**

The Seventh Environmental Action Plan was put into effect on 17 January 2014 with the slogan "Living Better Within the Limits of the Planet". In the plan, with the widespread use of sustainable development understanding and increased awareness, the insufficiency of the point reached was emphasized and it was stated that the problems could be overcome with technological developments. The plan covers a period of seven years between 2013-2020. The plan provides long-term views on the vision for 2050, setting priority targets by 2020, and discusses the difficulties in achieving this vision.

The plan, in which nine priorities were determined, entered into force a year later in order to comply with the legislation of the member countries, as seen in the previous plans. In the past time, the EU environment has been included in a wide range, as a result, air, water and soil pollution has been eliminated to a significant extent. Existing chemicals have been modernized and restrictions have been placed on the use of many hazardous and toxic substances. In line with the environmental objectives, the objectives that the plan aims to achieve by 2020 are as follows:

- Protection, preservation and development of the natural capital of the European Union (main priority),
- Ensuring the transition of the European Union to a green economy with efficient resource use, environmentally friendly, competitive and low carbon emission (main priority),
- Preventing health and well-being risks by protecting the citizens of the European Union from environmental hazards and pressures (main priority),
- Ensuring better implementation of European Union environmental legislation (activating priority)
- Increasing awareness and awareness of environmental risks by providing more effective information flow, concentrating on and expediting R&D studies (activating priority)



- Ensuring the realization of more logical and broad investments required for environmental and climate studies by increasing them (activating priority),
- Ensuring full integration and consistency of environmental requirements and regulations with other policy areas (activating priority),
- Developing and implementing sustainable urban policies to solve the waste problem by preventing air and noise pollution of EU member states,
- Increasing the international effectiveness of the EU on environmental issues, spreading the purpose of "Living Better Within the Boundaries of Our Planet", which is one of the EU's global approaches, together with the Sustainable Development Goals adopted at the Rio Summit.

The European Union Environmental Action Plans have been an element that supports the implementation and success of environmental programs. The plans prepared by the EU within the framework of the policies it determined with the aim of implementation by the member countries are guiding by setting an example to candidate countries and other world societies. While the policies established by the EU determine the general framework on environmental issues, environmental action plans ensure that the framework is filled in line with these policies. Elimination of environmental pollution by preventing environmental problems depends on the successful and determined implementation of these plans.

By 2020, Europe faces environmental challenges of an unprecedented scale and urgency. Even though EU environmental and climate policies have brought significant benefits over the past decades, Europe faces persistent problems such as biodiversity loss, resource use, the effects of climate change, and environmental risks to health and well-being. On the one hand, major global trends such as demographic change exacerbate many environmental challenges, while rapid technological changes bring new risks and uncertainties.

As the nature and dimensions of global environmental and climate challenges become clearer, policy frameworks have also changed. Europe's environmental policy framework, in other words, its environmental legislation, is increasingly shaped by ambitious long-term visions and goals. Europe's overall vision for the environment and society is set out in the Seventh Environmental Action Plan and predicts the following for the date of 2050:

*"We live well within the ecological boundaries of the planet. Our wealth and healthy environment are caused by a cyclical economy which is innovative and where nothing goes to waste and natural resources are managed in a sustainable way, and biodiversity is preserved, valued and re-protected in ways that increase the resilience of our society. Our low-carbon development has long ago been separated from resource use and set the standard for a safe and sustainable global society."*

It is clear that natural capital has not yet been protected, retained or developed as envisaged by the Seventh Environmental Action Plan. Low-protected species (23%) and habitats (16%) have positive conservation status, and Europe is not on track to achieve its goal of stopping biodiversity loss in 2020





(AÇA, 2020). Europe has achieved its goals in terms of identifying land and marine protected areas, and while some species have been rescued, it is possible that many other goals will not be achieved.

Europe has made further progress in resource efficiency and a circular economy. Material consumption has decreased, resource efficiency has increased, and thus gross domestic product has increased. Greenhouse gas emissions decreased by 22% between 1990 and 2017 due to both policy measures and economic factors. The share of renewable energy sources in final energy consumption has increased steadily, to 17.5% in 2017. Energy efficiency has also increased, and final energy consumption has decreased to the level it was in 1990. The release of contaminants into air and water has also been reduced and the overall EU water extraction rate has decreased by 19% between 1990 and 2015 (AÇA, 2020).

Human health and well-being continue to be affected by noise, hazardous chemicals and climate change. The rapid increase in climate change is likely to bring increased risks, especially for sensitive groups. Heatwaves, forest fires and floods and changes in the prevalence of infectious diseases can have negative effects. Moreover, environmental risks to health do not affect everyone in the same way, and there are significant local and regional differences across Europe in terms of social sensitivity and exposure to environmental health hazards. In general, the overall picture for reducing environmental risks to health and wellbeing is questioned. Systemic risks to health are complex and there are significant deficits and uncertainties in the knowledge base.

**Table 1 - Summary of Past Trends, Views and Expectations to Meet Policy Goals / Objectives**

THEME	Past Trends and Overview		Summary of Expectations to Meet Policy Goals / Objectives		
	Past Trends (10-15 Years)	Overview of 2030	2020	2030	2050
<b>Protection, preservation and development of natural capital</b>					
Protected terrestrial areas					
Protected marine areas					
Species and habitats protected by EU					
Common species (birds and butterflies)					
Ecosystem status and services					
Water ecosystems and wetlands					
Hydromorphological pressures					
State of marine ecosystems and biodiversity					
Pressures and impacts on marine ecosystems					
Urbanization and agricultural and forest land use					
Soil condition					
Air pollution and its effects on ecosystems					
Chemical pollution and its effects on ecosystems					
Climate change and its effects on ecosystems					
<b>Resource efficient, circular and low carbon economy</b>					





Efficiency of material resources					
Use of circular materials					
Waste generation					
Waste management					
Greenhouse gas emissions and mitigation efforts					
Energy efficiency					
Renewable energy sources					
Emission of air pollutants					
Industrial pollutant emissions					
Clean industrial technologies and processes					
Emission of chemicals					
Water extraction and its pressures on surface and groundwater					
Sustainable use of the seas					
<b>Protecting health and well-being from environmental risks</b>					
Concentrations of air pollutants					
Effects of air pollution on human health and well-being					
The exposure of the population to noise pollution and its impact on human health					
Preservation of quiet areas					
Pressures of pollution on water and its links with human health					
Chemical pollution and its risks to human health and well-being					
Risks of climate change for society					
Climate change adaptation strategies and plans					

Reference – EEA Environment in Europe – Status and Overall Picture 2020

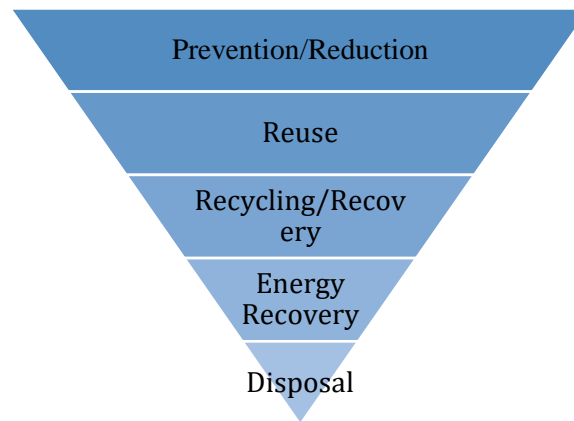
Indicative assessment of past trends (10-15 years) and a look at 2030	Scale	Indicative assessment of expectations to meet selected policy goals / objectives
Reforming trends / developments are dominating		Mostly on the right track
Trends / developments provides a mixed image		Partially on the right track
Worsening trends / developments prevail		Mostly not on the right track

## 2.2 Compliance of the Project with National Policy Documents

The institution that deals with waste management in Turkey is the Turkish Ministry of Environment and Urbanization. The Department of Zero Waste and Waste Processing within the General Directorate of Environmental Management, which is part of the Ministry, deals with waste. The Department of Waste Management is obliged to prepare legislation on the prevention and control of environmental pollution, to develop standards and to determine the principles of waste management, so as not to harm human health from the formation of waste to its final disposal. Waste is subject to different regulations according to their types. Different regulations have been issued for a wide range of wastes such as electrical and electronic waste (EU directive), hazardous waste, packaging waste, waste batteries and batteries, etc.

Within the scope of waste management, the waste hierarchy has been determined. In the waste hierarchy, waste management options are listed in order to reduce the damage to the environment.

**Figure 8- Waste Hierarchy**



**Reference: Domestic Solid Waste Tariff Determination Method for Local Authorities, 2018**

According to the waste management hierarchy given in the figure, waste management takes the form of an inverted pyramid and involves reducing waste disposal to a minimum in practice and acting on the principle of prevention and reduction of the main base of the pyramid. The first stage is to prevent the generation of waste. If prevention cannot be provided, waste is intended to be minimized at its source. Then the re-use of waste is tried. If reuse is not possible, recycling or energy recovery is provided. The most recent operation on waste where these methods are not applied is disposal. Disposal includes processes such as regular landfill, incineration, etc...

The provisions of the Air Quality Assessment and Management Regulation (HKDYY), published in the Official Gazette dated 06.06.2008 and numbered 26898, apply to the evaluation of air quality data within the scope of the European Union harmonization process. In this Regulation, it is aimed that our country gradually reduces pollution burden and fully comply with EU limit values by 2019. Limit values and implementation schedules for 13 different pollutants mentioned in the EU directives have been determined.

The Regulation in question provides the necessary tools such as fresh air and action plans to improve air quality. The Regulation also aims monitoring, sanction and institutional strengthening in the areas of pollution control and air quality. In accordance with the HKDY Regulation, short-term emergency measures can also be implemented in order to reduce the risk of excess, reduce the severity and duration of excess in cases of sudden pollution, such as limit value exceeds after dust transport. Examples include restrictions in industrial facilities, restrictions in motor vehicle traffic, and hour adjustments for heating in combustion systems.

### **Waste Legislation in Turkey**

The diversity of regulations relating to waste and general waste management in Turkey has been developed in accordance with EU Directives. In addition, regulations in accordance with the conditions of the country have been published and implemented. In this context, applications regarding domestic solid wastes, excavation soil, construction and demolition wastes, medical wastes, hazardous wastes, packaging wastes, waste batteries and accumulators, vegetable waste oils, end-of-life tires, waste



electrical and electronic equipment, waste oils, end-of-life vehicles, polychlorinated biphenyls and polychlorinated biphenyls and landfilling of wastes continue. One of the important principles of Turkey's waste management strategy is the prevention of waste generation at source. If this cannot be achieved, reducing waste and recycling of waste in case waste generation is inevitable are among waste management strategies. The reuse of wastes has been discussed in all legal regulations constituting the environmental legislation, especially the Environmental Law. Recycling of waste as material and energy is considered as one of the primary management principles. In addition, recycling activities have been encouraged and criteria have been established to increase the technical and administrative competence of recycling facilities. The facilities that meet these criteria are licensed so that they contribute to the economy and the environment.

**Table 2- Legislation Regarding Solid Waste Management in Turkey**

Related Legislation	Purpose	Scope
<b>Environmental Law (2872)</b>	It aims to protect the environment in line with the principles of sustainable environment and sustainable development..	It includes the measures and prohibitions for the protection of the environment, the establishment of an environmental pollution prevention fund, the principles regarding the utilization and use of the fund, and various penal provisions.
<b>Municipal Law (5393)</b>	The establishment, organs, management, duties, powers and responsibilities of the municipality and the working principles and procedures are regulated in this Law.	
<b>Municipal Revenues Law (2464)</b>	With the "Polluter Pays" principle, waste generators are included in waste management.	
<b>Waste Management Regulation (02.04.2015-29314)</b>	It aims to ensure management of wastes without harming the environment and human health from generation to disposal, reducing waste generation, reuse, recycling and recovery of wastes, and reducing the use of natural resources and ensuring waste management.	It includes the wastes given in the Annex-4 waste list of the Regulation, electrical and electronic goods, packaging, vehicles, batteries and accumulators products managed within the framework of the expanded manufacturer's responsibility.
<b>Regulation on the Landfill of Wastes (26.03.2010-27533)</b>	It aims to determine technical and administrative aspects and the general rules of the disposal of wastes by the regular landfill method, before storage, during operation and closure.	General provisions regarding sanitary landfill facilities, license processes, construction of sanitary landfill facilities, operation of sanitary landfill facilities and waste acceptance criteria are included. In addition, there are control and monitoring processes, tests and sampling methods and required standards during operation and after closure.



<b>Regulation on Incineration of Waste</b> (06.10.2010/27721)	It is to prevent the negative effects of waste incineration on the environment. In addition, it is to prevent and limit the pollution caused by emissions, especially in air, soil, surface water and groundwater, and the risks that may arise for human health by applicable methods.	The regulation includes the minimum requirements for waste incineration and co-incineration facilities. This includes permission for facilities, operation of facilities, waste water treatment resulting from flue gas treatment, residues, inspection and monitoring conditions.
<b>Regulation on Packaging Waste Control</b> (24.08.2011/28035)	It is aimed to determine the legal, administrative and technical principles for the prevention of the formation of packaging wastes, the recycling / recovery, disposal, collection and transportation of those that cannot be prevented, and the establishment of relevant standards.	The regulation includes general principles, duties, authorities and obligations, provisions regarding packaging production, recycling, separate collection at the source, organization conditions to be authorized, obtaining an environmental license, various provisions and explanations.
<b>Regulation on Medical Waste Control</b> (22.07.2005/25883)	It aims to prevent medical wastes from being released to the receiving environment in a way that will harm the environment and human health from production to disposal. In addition, it regulates the procedures and principles regarding the determination and implementation of the legal, administrative and technical principles for waste management.	It covers the principles of wastes generated as a result of the activities of health institutions and their separate collection, temporary storage, transportation and disposal of these wastes at the places where they are generated.
<b>Regulation on Waste Oil Control</b> (30.07.2008/26952)	It aims to determine the procedures and principles for determining the necessary principles and programs in order to ensure the management waste oils without harming the environment and human health from production to disposal of them.	It covers the prohibitions, restrictions and obligations, measures to be taken and inspections to be carried out regarding the generation, temporary storage, collection, transportation, processing, disposal, import and export and transit of waste oils in categories I., II. and III.
<b>Regulation on Control of Waste Vegetable Oils</b> (19.04.2005/25791)	It aims to ensure the regulation of legal and technical principles to ensure environmentally compatible management of waste vegetable oils from production to final disposal.	It regulates the prohibitions, restrictions and obligations, measures to be taken, inspections to be made, legal and criminal responsibilities to be subjected of temporary storage, collection, transportation, recovery, disposal, trade, import and export and transit of vegetable waste oils.



<p><b>Regulation on Control of Waste Batteries and Accumulators (31.08.2004/25569)</b></p>	<p>It aims to determine environmentally friendly programs for the establishment of the collection system and the creation of a management plan, starting from the production of batteries and accumulators to their final disposal.</p>	<p>It includes measures to reduce the amount of harmful substances in the labeling, marking and production of battery and accumulator products. It also regulates the prohibitions, restrictions and obligations, measures to be taken, inspections to be made, responsibilities to be subjected to regarding the separate collection of them from household and other wastes, their transportation, disposal and import, transit and export.</p>
<p><b>Regulation on the Control of End-of-Life Vehicles (30.12.2009/27448)</b></p>	<p>It is to determine the the reuse, recycling / recovery processes of end-of-life vehicles and their parts in order to protect the environment and human health, and the standards and obligations the economic operators and temporary storage areas will be subject to.</p>	<p>Covers vehicles in the M1, N1 category specified in Article 3 of the Highway Traffic Regulation, three-wheeled vehicles other than motorcycles and motor bicycles. In addition, it includes the end-of-life vehicles in these categories and their parts and materials.</p>
<p><b>Regulation on Control of End-of-Life Tires (25.11.2006/26357)</b></p>	<p>The purpose of the regulation is to determine the administrative and technical principles for the establishment of an environmentally compatible management plan for tires that have completed their life, and to ensure the necessary regulations and standards in their management.</p>	<p>It includes the legal limitations and obligations, measures to be taken, inspections to be made, legal and criminal responsibilities to be subjected to regarding the separate collection from other wastes, transportation, temporary storage, recovery, disposal, import, export and transit of all tires that have completed their life, except for bicycles and solid tires.</p>
<p><b>Regulation on Control of Waste Electrical and Electronic Equipment (22.05.2012/28300)</b></p>	<p>It aims to regulate the legal and technical principles regarding the methods and objectives of the management of these wastes in harmony with the environment and people, from the production of electrical and electronic equipment to their final disposal.</p>	<p>It covers electrical and electronic equipment included in the categories in Annex-1 / A of the Regulation.</p>



<b>Regulation on Control of Polychlorinated Biphenyls and Polychlorinated Terphenyls (27.12.2007/26739)</b>	It is to regulate administrative and technical procedures and principles for the complete elimination of used polychlorinated biphenyl (PCB) and PCB containing materials and equipment without harming the environment and human health.	It covers the preparation, temporary storage, transportation, purification and disposal of used polychlorinated biphenyls (PCB) and PCB containing materials and equipment, requirements, measures to be taken and legal and criminal responsibilities to be subjected to.
<b>Regulation on Excavation Soil, Construction and Demolition Waste Control (18.03.2004/25406)</b>	It is to regulate the technical and administrative issues and general rules to be followed regarding the primarily reduction at the source, collection, temporary accumulation, transportation, recovery, utilization and disposal of excavation soil and construction and demolition wastes in a way not to harm the environment.	It covers the principles regarding the separate collection at the place they are generated, temporary accumulation, transportation, recovery, evaluation and disposal of excavation soil and construction and debris waste of which the sources and components are specified detailly in Annex-1 and which are formed after human activities and natural disasters.

**Reference: Official Gazzette, 2020.**

Legislation on solid waste management and their objectives and scopes are briefly explained in the table. Accordingly, the waste management policies carried out by the municipalities must comply with the aforementioned legislation.

### **2.2.1 Sectoral or Regional Policies and Programs**

Today, various regulations and laws regarding waste management are in effect. Waste management is carried out according to the said legislations. These include Environmental Law, Municipality Law, Regulation on Waste Management, Regulation on Landfill of Waste, Regulation on Incineration of Waste, etc.

The National Waste Management and Action Plan covering 2016-2023 has been prepared by the T.R. Ministry of Environment and Urbanization. The main objective of the plan is to protect and develop natural resources and ecosystems and to create a healthy and livable environment for current and future generations. The plan is prepared within the framework of sustainability principle, taking into account international norms and national priorities, and within the framework of policy and strategy determination responsibility on strategy and regulatory development, minimizing waste at source, class separation, collection, transportation, temporary storage, recovery, disposal, reuse, purification, conversion into energy and final storage of waste. With the policies and practices to be carried out within the framework of the National Waste Management and Action Plan, Turkey will be provided with a better organized, integrated and institutional structured waste management system. In addition, public health and environmental cleanliness will be provided with the Plan. Medium and long-term





targets are set in the plan. Accordingly, in 2023, 35% of the total waste generated throughout Turkey is intended to be disposed of by recovery and 65% by landfill management.

**Table 3- National Waste Management and Action Plan 2023 Targets**

Target	2014 (%)	2023 (%)
<b>Rate of Packaging Waste Collected Separately at Source</b>	5,3	12
<b>Recovery Rate of Municipal Wastes by Biological Methods</b>	0,2	4
<b>Recovery Rate of Municipal Wastes by Mechanical Biological Processes</b>	5,4	11
<b>Recovery Rate of Municipal Wastes by Thermal Methods</b>	0,3	8
<b>Disposal Rate of Municipal Wastes by Landfill Method</b>	88,7	65

Reference: T.R. Ministry of Environment and Urbanization, 2020.

The table shows the 2023 targets specified in the National Waste Management and Action Plan. In 2023, the waste rate disposed of by the method of landfill is expected to be 65%.

In the National Waste Management and Action Plan, rehabilitation of wild dumping sites, spread of construction wreckage and excavation soil management throughout the country, increasing collection and recovery efficiency in the management of special wastes, increasing additional facility investments for recovery and disposal of hazardous wastes are among the medium and long-term goals.

The Eleventh Development Plan, published by the T.R. Head of Strategy and Budget, includes Livable Cities and Sustainable Environment targets under the heading of Plan's Objectives and Policies. Under the heading of Livable Cities and Sustainable Environment targets, objectives for various areas have been determined. Objectives for the development of urban infrastructure is one of them. Ensuring the access of the population to healthy and reliable water, minimizing the effects of wastewater on human and environmental health and ensuring effective management are among the goals for improving the urban infrastructure. In addition, reducing the effects of wastes on human and environmental health in order to realize their effective management, ensuring recycling and recovery and disposing of them are among the goals determined to improve the urban structure. The creation of accessible, safe, time-effective and cost-effective and sustainable urban transportation systems are among the objectives set out for the improvement of urban infrastructure. Various policies and measures have been set for the realization of objectives for the improvement of urban infrastructure. These policies and measures include waste reduction by enabling solid waste management, separation at the source, separate collection, transport, recovery, disposal phases and rehabilitation of irregular/wild dumping areas, improving them as a technical and financial whole.

In addition, the Eleventh Development Plan stated that public awareness will be provided for the recycling of solid waste, zero waste project applications and separate collection system of waste will be expanded. The plan stated that technical standards for the recovered secondary product will be improved and incentive and guidance legislation will be improved.





The Eleventh Development Plan stated that domestic solid waste recovery and disposal facility projects and transfer station projects, which are difficult to finance by under-financially funded local governments, will be supported within a program. This support will be provided for the purpose of improving urban infrastructure. Furthermore, efforts will be made to disseminate the implementation of the Solid Waste Program. In the table below, urban infrastructure goals in the 11<sup>th</sup> Development Plan are given. Accordingly, in 2018, the recovery rate of waste is 13%. This rate is set to be 35% in 2023.

**Table 4- 11. Goals Specified in the Development Plan**

Goals	2018	2023
<b>Waste Recovery Rate Under Zero Waste Project (%)</b>	13	35
<b>Number of Buildings with Zero Waste Program (Thousand)</b>	13	400
<b>Rate of Municipal Population Provided with Landfill Service (%)</b>	75	100

Reference: T.R. Head of Strategy and Budget, 2020.

Waste management in Turkey is provided by provincial directorates of environment and urbanism, particularly the Ministry of Environment and Urbanization, metropolitan municipalities, municipalities, district municipalities, licensed companies, authorized organizations.

The duties, powers and responsibilities of the institutions and organizations mentioned above were determined by the regulations, circulars and communiqués, particularly Environmental Law no. 2872, issued by the Ministry of Environment and Urbanization,

Waste Management Regulation was published by the Ministry of Environment and Urbanization. The aim of the regulation is to ensure management of waste from formation to disposal without harming the environment and human health. Furthermore, reducing natural resource use and ensuring waste management by means such as reducing waste formation, reuse, recycling, recovery of waste is among the objectives of the Regulation. General principles of waste management are stated in the Regulation. In addition, provisions regarding the duties and powers of the Ministry, provincial directorates and municipalities in this regard are included. In addition, the obligations of the waste generator, waste owner and waste processing facilities are included in the Regulation.

Waste Collection Center Communiqué was published in the Official Gazette dated 31.12.2014 and numbered 29222. The purpose of the communiqué is to determine the procedures and principles for waste collection centers created to ensure that recoverable waste is collected separately at its source without being mixed with other wastes and is left for recovery and/or disposal. The communiqué includes provisions for waste collection centers and their technical specifications.

The Ministry of Environment and Urbanization has issued the Regulation on The Landfill of Waste. The purpose of the regulation is to determine the technical and administrative issues and general rules to be followed regarding the prevention of environmental pollution by minimizing the negative effects of leachate and storage gases on the soil, air, ground and above water that may occur during the disposal of wastes by the landfill method. In addition, it is to determine the rules regarding the acceptance of waste to the landfill facilities, the operation of the facilities, the control and maintenance processes after the closure of the facilities, and the prevention of adverse events that may pose a risk to the environment and human health, including the greenhouse effect, closure and post-closure maintenance processes.

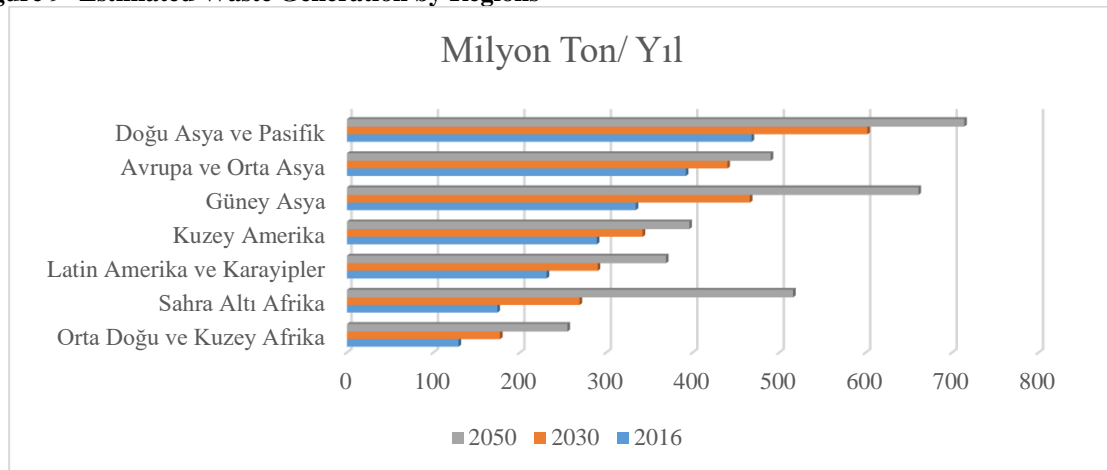
### 3 GOOD PRACTICES EXAMPLES

#### 3.1 Current Situation in the World and Good Practices

##### 3.1.1 Current Situation in the World

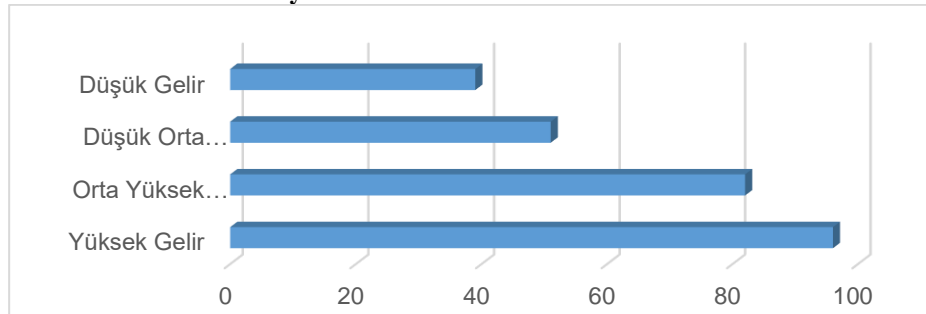
The world generates an average of 2.01 billion tons of solid waste annually, according to recorded data. 30% of this is not managed safely in terms of the environment. The average amount of waste generated per person worldwide is known as 0.74 kg. However, this number varies between standard deviations and 0.11-4.54 kg. High-income countries make up 16% of the world's population. Nevertheless, they constitute about 34% (683 Million Tons) of waste in the world. Waste is expected to reach 3.40 billion tons globally by 2050. There is known to be a positive relationship between waste production and income level. By 2050, waste production per person is expected to increase by about 40% or more in developed countries. It is estimated that there will be a 19% difference between low- and middle-income countries.

**Figure 9- Estimated Waste Generation by Regions**



Reference: World Bank, 2020.

**Figure 10- Waste Collection Rates by Income Level**



Reference: World Bank, 2020.

Depending on the volume, composition and management of waste generated in the world, it is estimated that greenhouse gas emissions equivalent to 1.6 billion tons of carbon dioxide (CO<sub>2</sub>) were produced from solid waste treatment and disposal in 2016. Disposal of wastes to open dumps without a garbage collection system is one of the most important reasons. Food waste constitutes about 50%



of emissions. Without an improvement in the sector, emissions from solid waste are projected to increase by 2.38 billion tons of CO<sub>2</sub> annually by 2050. In many countries, solid waste management operations are typically a local responsibility. Approximately 70% of the countries have established institutions in the waste sector with responsibility for policy development and regulatory oversight. Nearly two-thirds of countries have created targeted legislation and regulations for solid waste management. Operating costs for integrated waste management, including collection, transportation, treatment and disposal in high-income countries, typically exceed \$100 per ton. Low-income countries spend about \$35 per ton on waste processes. However, these countries have more difficulty in recovering costs. Waste management is a labor-intensive process. Shipping costs alone vary between \$20-50 per ton.

### **3.1.2 Good Practice Examples**

#### **3.1.2.1 Hong Kong Example**

In Hong Kong, due to the widespread use of compactor garbage collection tools, bulky waste is defined as substances that traditional compactor type garbage collection tools cannot collect.

Volume waste is included in the flow of municipal solid waste in Hong Kong. Domestic bulky waste is collected free of charge by the municipal cleaning team, while volumes of waste from commercial and industrial waste flows are collected according to the price set by waste generators.

Annual statistics on the amount of municipal solid waste disposed of in Hong Kong are published in the "Monitoring of Solid Waste in Hong Kong" section, which is available to the public over the internet. Weight data for municipal solid waste is derived from the compilation of records from landfill scales and major Waste Transfer Stations in Hong Kong. No analysis of material composition of volume waste is carried out in Hong Kong.

In Hong Kong, all municipal solid waste (including bulky waste) is sent directly or through a network of waste transfer stations to one of the three landfills. Data shows that approximately 6% of municipal solid waste in the region (576 tons/day) is bulky waste (Ref: Chung et al. / Waste Management 30 (2010) 737–743)

#### **3.1.2.2 England-Wales Example**

With the understanding that started with the collection and distribution of aid by the church organization called Salvation Army in the 1890s in England, third sector reuse organizations have been established in many parts of England to collect and redistribute home furniture and appliances to those who need it. This development is driven by the social economy regardless of government intervention. Hundreds of organizations are each privately run. Such organizations are typically established when individuals or small groups of people need this kind of service and take action to do so. The main purpose of these organizations is to reduce poverty by providing basic household items. Providing education and work experience to disadvantaged/long-term unemployed is clearly of general importance. This is a second priority for a small part and most of these organizations. A report on the voluntary and community waste sector in England found that refurbishing and reusing furniture and household items was the most common activity. This activity directs households from waste flow back



to use, increases waste formation and balances waste resource consumption. Waste reduction, however, is a coincidental effect of the core work of organizations. However, other research has identified the additional advantage the voluntary sector can offer through its basic waste collection service. These are;

- Providing furniture for low-income families,
- Promoting citizen participation and volunteering opportunities,
- Training for the long-term unemployed,
- Job placements for people with learning difficulties,
- A community building role that promotes interaction between different groups in the community.

Controlled Waste Regulation 1992 is the basis for the identification of bulky waste. Any waste items weighing 25 kg and any waste material that cannot be added to a 750 mm diameter and 1m long tank are described as large bulky waste.

Bulky wastes are sold or donated directly if they are in good condition. If the waste is not in a condition to be re-used, it is considered waste. In this case, it can be collected by local governments or a waste collection company for a fee or taken to the Domestic Waste Recycling Centers provided by the local governments by the homeowners or illegally disposed of anywhere by the person. This is known as fly-tipping, which means leaving illegal waste somewhere in England.

Existing domestic waste management strategies in England, in line with EU Directives, aim to reduce dependence on landfills and move towards more sustainable practices.

Bulky items collected represent less than 5% of total domestic waste. Approximately 30% of the bulky waste collected by local governments is recycled. Only 2-3% of the waste is reused. The use of large bulky waste, including electrical and electronic equipment and textiles, is estimated at around 500,000 tons per year in England.

The basic operations of reuse organizations can be summarized in simple terms. These organizations are used to collect donated household items and appliances and distribute them to low-income people after repair.

The process of collecting unwanted items begins with a direct phone call from the host, usually to the institution to collect any undesirable items that are still in good condition. Another common method is for the local authorities to redirect the waste collection service call center to the reuse organization, where necessary, for bulky waste collection requests. This happens in 73% of local authorities.

The collection requests arrange the geographical order of the area covered by the organization and the availability of its resources in terms of time and space in a chart. This determines whether certain requests will be accepted and the length of time to wait until they are collected.

Typical programming practices of reuse organizations indicated that donors should only wait 1 or 2 days for their items to be collected. There are also free waste collectors as well as paid collectors. The fees of the two organizations collecting waste are 5 Euros and 10 Pounds.



**Table 5- Source of Waste from Reuse Organizations**

Reuse Sources	Rate of Usable Items From This Source (%)
Public Donations	86
Commercial Organizations	9
Bulky Waste Collection Service	2
Domestic Waste Recycling Centers	3

**Reference: The Role of Furniture and Appliance Re-Use Organisations in England and Wales, 2008**

649 vehicles were used by 240 organizations for waste collection in 2007/08.

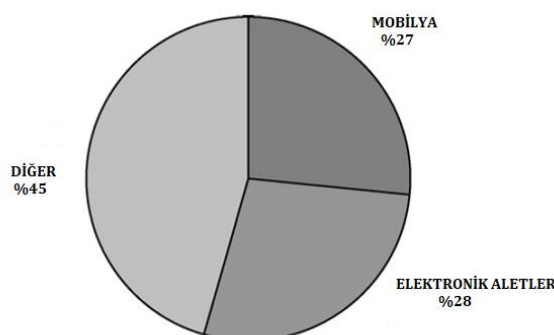
Reuse organizations require physical space to operate. Furniture and devices collected are stored, processed and exhibited in this area.

### **3.1.2.3 England Example**

Waste management in England follows a two-step approach. Waste collection authorities are responsible for providing daily domestic waste collections. In places called Transfer Stations, Waste Disposal Authorities take over and dispose of waste. Some urban areas of England are managed by Unitary Authorities that take responsibility for the collection and disposal of waste generated within their borders. This two-step system has resulted in two standard options provided by the authorities for destroying bulky items. The Waste Collection Authorities operate a special collection service for bulky items, which usually includes a collection fee. Waste Disposal Authorities bring bulk waste free of charge to Domestic Waste Recycling Centers to meet the requirements called under the Civic Convenience Act of 1967. These disposal methods are licensed under the 1990 Environmental Protection Act. Local private companies, communities or charities may also collect some bulky items. In addition, residents can transfer items in use to their friends or family. They can also sell bulky products through informal exchange networks.

England government has taken measures to improve performance in domestic waste management today. However, the operational management of bulky domestic waste was not affected to the extent expected by these initiatives. This is because large bulky waste constitute a relatively small part of the total waste sources. Less than 5% of 25.4 million tons of domestic waste collected across the UK in 2003/2004 was bulky waste. Although England government's Waste Strategy 2000 includes the Waste Hierarchy, little preparation has been made for the reuse of targets and standards applied to local authorities. Reuse of bulky items contributes to the environment. It also has social benefits for charities, volunteers and recipients of items.

Figure 11- Categories of Household Bulky Waste Flows



**Reference: Management of Household Bulky Waste in England, 2007**

In the study, 225 households in Bath (South-West England, population 169,000) and Swindon (South-West England, population 180,000) were surveyed. 65% of the 466 respondents indicated that they had thrown bulky items in the 12 months prior to the survey. A total of 1,191 bulky items were thrown during the study period. Composition of bulky waste varies according to individual collection methods. According to the rate of the overall bulky waste flow in each category, the bulky waste collected contains a high proportion of furniture (79%) and household appliances (36%). As a result, according to the study conducted in 2007 in England, it has been reported that an average of 132 kg / household bulky waste was generated, which corresponds to 1.8 million tons in total.

Table 6- Domestic Bulky Waste Categories

Category	Content
<b>Furniture</b>	Bed base, bed, sofa, table, chair, bedroom furniture (wardrobe, chest of drawers, etc.), other units (TV unit, cupboard, etc.)
<b>Appliances</b>	Refrigerator, freezer, cooker, washing machine, dryer, TV, video player, computer unit, monitor, microwave
<b>Other</b>	Carpet, cellar floor, armatures and appliances (radiators, bathroom and kitchen units, etc.), structure/building waste (debris, cut, etc.), bagged garden waste, other garden products (lawnmower, etc.), wood, bags of small items, bicycle

**Reference: Management of Household Bulky Waste in England, 2007**

22% of 304 households participating in the survey have thrown bulky items. Thrown items were collected by the volunteer / charity organization. It is estimated that approximately 82 items and devices (equivalent to 2.8 tons) were collected for reuse.





**Table 7- Bulky Wastes in Selected Areas**

Country/City	Year	Amount (Tons)	Analysis
<b>England</b>	2003	1,2 Million	Includes waste collected from street and street sidewalks.
<b>Ireland</b>	2007	15.507	Includes domestic, commercial and unprocessed industrial wastes. Electronic instruments are not included. Includes other bulky waste.
<b>Wales</b>	2001	80.900	Includes carpets, furniture, white goods, large electronics, TVs, monitors and other waste electronics.
<b>Sweden</b>	1998	1,053 Million	Includes only large waste in the domestic waste flow.
<b>USA</b>	2007	41,2 Million	Data represent durable and good waste.
<b>Seoul, Korea</b>	2005	113,461	Bulky waste disposal is charged at variable rates.
<b>Hachioji, China</b>	2006	1.920	Televisions, refrigerators, washing machines and air conditioners are subject to mandatory recycling. Therefore bulky waste figures and collection arrangement do not include these four types of devices.
<b>Taipei, Taiwan</b>	2006	8.955	Refers to municipal solid waste, usually domestic waste and waste from commercial sources with less than 30 liters per day for waste disposal.
<b>Abu Dhabi Emirate*</b>	2017	177,932	Includes white goods, old furniture and beds. It is equivalent to 20% of the domestic waste amount.
<b>Hong Kong</b>	2007	15.330	Bulky wastes are sent directly to landfills.

**Reference: Measuring Bulky Waste Arisings in Hong Kong, 2010**

## **3.2 Current Situation and Good Practices in the Member States of the European Union**

### **3.2.1 Current Situation**

It is predicted that waste generation in the world will increase more than twice the population growth until 2050. Waste generation is a natural product of urbanization, economic development and population growth. Waste management policies evolve as countries rise from low income to middle and high income. Countries and cities offer more products and services to citizens in line with their population growth. In this direction, while participating in global trade and change, they are faced with the amount of waste that can be managed through treatment and disposal. Amounts of waste vary by country.



**Table 8- European Countries Total Amount of Waste by Years<sup>1</sup>**

Region (Tons)	2010	2012	2014	2016
<b>Europe (28 Countries)</b>	2.454.720.000	2.484.270.000	2.507.090.000	2.537.770.000
<b>Belgium</b>	61.345.803	53.839.470	57.965.392	63.152.384
<b>Bulgaria</b>	167.396.268	161.252.166	179.677.011	120.508.475
<b>Čzechia</b>	23.757.566	23.171.358	23.394.956	25.381.426
<b>Denmark</b>	16.217.736	16.713.822	20.808.843	20.981.931
<b>Germany</b>	363.544.995	368.022.172	387.504.241	400.071.672
<b>Estonia</b>	19.000.195	21.992.343	21.804.040	24.277.879
<b>Ireland</b>	19.807.586	12.713.021	15.166.830	15.251.689
<b>Greece</b>	70.432.705	72.328.280	69.758.868	72.358.026
<b>Spain</b>	137.518.902	118.561.669	110.518.494	128.958.523
<b>France</b>	355.081.245	344.731.922	324.462.969	323.474.270
<b>Croatia</b>	3.157.672	3.368.714	3.724.563	5.277.598
<b>Italy</b>	158.627.618	154.427.046	157.870.348	163.995.048
<b>Cyprus</b>	2.371.203	1.870.769	1.974.160	2.462.503
<b>Letonia</b>	1.498.200	2.309.581	2.621.495	2.532.684
<b>Lithuania</b>	5.578.134	5.678.751	6.200.450	6.644.315
<b>Luxembourg</b>	10.441.469	8.397.228	7.072.758	10.130.076
<b>Hungary</b>	16.735.423	16.310.151	16.650.639	15.938.077
<b>Malta</b>	1.352.994	1.456.213	1.664.836	1.965.514
<b>The Netherlands</b>	121.145.468	121.194.466	132.362.297	141.024.020
<b>Austria</b>	46.799.579	48.045.089	55.868.298	61.225.037
<b>Poland</b>	158.661.957	162.382.959	179.179.899	182.005.677
<b>Portugal</b>	13.640.079	13.359.517	14.368.003	14.739.135
<b>Romania</b>	201.432.951	249.354.926	176.607.415	177.562.905
<b>Slovenia</b>	5.986.106	4.546.506	4.686.417	5.494.362
<b>Slovakia</b>	9.384.112	8.425.384	8.862.778	10.606.966
<b>Finland</b>	104.336.944	91.824.193	95.969.888	122.869.183
<b>Sweden</b>	117.645.185	156.306.504	167.026.886	141.625.718
<b>United Kingdom</b>	241.820.047	241.690.407	263.319.476	277.254.977
<b>Iceland</b>	510.941	529.351	815.148	1.067.319
<b>Liechtenstein</b>	312.180	466.547	569.067	502.581
<b>Norway</b>	9.432.997	10.720.872	10.614.912	11.131.594
<b>Montenegro</b>		385.507	1.164.024	1.685.006
<b>Northern Macedonia</b>	2.327.590	8.472.343	2.186.612	1.424.859
<b>Serbia</b>	33.615.918	55.002.574	49.128.310	48.965.314
<b>Turkey</b>	63.540.624	67.383.777	73.075.119	75.534.645
<b>Bosnia-Herzegovina</b>		4.456.556		
<b>Kosovo</b>		1.166.619	1.039.803	2.855.990

Reference: Eurostat, 2020.

<sup>1</sup> Data are the most up-to-date data available.



The table contains the most up-to-date waste data obtained. Accordingly, the amount of waste in Europe (28 countries) is increasing every year.

**Table 9- European Countries Domestic Waste Amount by Years**

Region (Tons)	2010	2012	2014	2016
<b>Europe (28 Countries)</b>	<b>183.570.000</b>	<b>170.290.000</b>	<b>163.930.000</b>	<b>167.100.000</b>
<b>Belgium</b>	3.835.659	3.816.888	4.111.682	3.889.517
<b>Bulgaria</b>	3.106.617	3.110.086	2.774.844	2.440.719
<b>Čzechia</b>	3.309.223	3.100.293	2.940.572	3.004.605
<b>Denmark</b>	2.805.523	2.643.618	2.505.806	2.474.107
<b>Germany</b>	21.375.563	20.955.467	21.106.836	21.363.772
<b>Estonia</b>	304.687	294.189	306.501	330.860
<b>Ireland</b>	3.265.130	2.111.426	1.850.418	1.908.774
<b>Greece</b>	4.770.638	4.305.143	4.085.632	4.131.022
<b>Spain</b>	21.119.514	19.584.291	18.169.188	19.480.579
<b>France</b>	22.178.904	22.371.457	21.332.273	21.205.306
<b>Croatia</b>	1.516.125	1.395.596	1.342.167	1.331.712
<b>Italy</b>	21.378.070	18.421.356	16.798.421	15.391.034
<b>Cyprus</b>	172.669	389.558	350.293	434.043
<b>Letonia</b>	562.626	726.708	552.387	607.862
<b>Lithuania</b>	1.064.522	1.016.339	932.914	849.843
<b>Luxembourg</b>	209.799	207.987	212.383	218.204
<b>Hungary</b>	3.194.549	2.897.445	3.294.411	2.922.941
<b>Malta</b>	218.098	205.607	206.790	223.524
<b>The Netherlands</b>	7.431.864	7.185.887	6.843.915	6.782.333
<b>Austria</b>	3.663.548	2.623.817	2.773.709	2.831.357
<b>Poland</b>	8.638.333	8.774.311	8.664.017	9.021.031
<b>Portugal</b>	5.073.000	4.516.634	4.417.162	4.568.846
<b>Romania</b>	6.493.299	5.329.192	5.081.779	5.218.255
<b>Slovenia</b>	776.830	559.936	359.610	353.882
<b>Slovakia</b>	1.458.095	1.381.619	1.395.520	1.413.678
<b>Finland</b>	2.030.598	1.593.938	1.432.560	1.362.532
<b>Sweden</b>	2.510.784	2.586.764	2.165.423	2.282.990
<b>United Kingdom</b>	31.101.594	28.184.234	27.925.093	31.060.323
<b>Iceland</b>	64.215	59.619	119.996	127.765
<b>Liechtenstein</b>	8.731	8.776	8.584	8.268
<b>Norway</b>	986.131	1.161.877	1.023.211	1.011.736
<b>Montenegro</b>		1.315	253.944	267.325
<b>Northern Macedonia</b>	457.051	2.962	5.131	41.316
<b>Albania</b>			1.228.884	
<b>Serbia</b>	21.006	149.908	1.602.117	1.656.129



<b>Turkey</b>	<b>29.564.564</b>	<b>30.867.795</b>	<b>30.873.096</b>	<b>32.224.469</b>
<b>Bosnia-Herzegovina</b>		14.042		
<b>Kosovo</b>		753.915	755.401	398.571

Reference: Eurostat, 2020.

The table contains the most up-to-date domestic waste data obtained. Accordingly, the amount of domestic waste in Europe (28 countries) was 167.100.000 tons in 2016. The amount of domestic waste of Turkey in 2016 was determined as 32.224.469 tons.

**Table 10- European Countries Textile Waste Amount by Years**

<b>Region (Tons)</b>	<b>2010</b>	<b>2012</b>	<b>2014</b>	<b>2016</b>
<b>Europe (28 Countries)</b>	<b>2.150.000</b>	<b>2.140.000</b>	<b>2.210.000</b>	<b>2.190.000</b>
<b>Belgium</b>	257.223	175.440	206.022	169.949
<b>Bulgaria</b>	5.833	7.038	15.505	9.942
<b>Czechia</b>	62.259	63.152	90.297	108.273
<b>Denmark</b>	1.469	14.527	2.932	18.134
<b>Germany</b>	238.080	310.449	343.757	391.752
<b>Estonia</b>	1.514	1.522	2.024	4.024
<b>Ireland</b>	5.191	25.114	8.083	22.944
<b>Greece</b>	4.531	1.679	1.560	1.268
<b>Spain</b>	100.323	76.508	110.321	98.881
<b>France</b>	380.000	440.000	175.000	210.001
<b>Croatia</b>	17.430	3.281	8.504	9.921
<b>Italy</b>	434.017	394.828	439.752	465.925
<b>Cyprus</b>	30.962	1.125	1.330	2.140
<b>Letonia</b>	443	167	302	235
<b>Lithuania</b>	4.799	8.935	7.491	8.525
<b>Luxembourg</b>	5.748	5.766	8.112	11.074
<b>Hungary</b>	26.637	20.132	16.322	23.190
<b>Malta</b>	24	132	339	567
<b>The Netherlands</b>	107.245	114.260	95.156	102.261
<b>Austria</b>	54.023	46.017	72.638	62.446
<b>Poland</b>	82.996	93.798	261.135	103.683
<b>Portugal</b>	81.624	58.839	70.144	81.715
<b>Romania</b>	18.774	15.073	25.697	30.360
<b>Slovenia</b>	7.403	6.834	8.320	8.732
<b>Slovakia</b>	8.351	9.445	11.484	14.751
<b>Finland</b>	7.704	16.050	17.218	14.934
<b>Sweden</b>	19.077	5.727	5.743	8.646
<b>United Kingdom</b>	183.927	223.088	208.891	206.456
<b>Iceland</b>	1.100	0	0	0
<b>Liechtenstein</b>	4	0	0	0
<b>Norway</b>	20.104	4.559	2.676	3.064



<b>Montenegro</b>		2	472	393
<b>Northern Macedonia</b>	3.244	2.772	720	872
<b>Serbia</b>	1.056	3.435	3.823	12.366
<b>Turkey</b>	<b>85.496</b>	<b>160.658</b>	<b>214.324</b>	<b>206.442</b>
<b>Bosnia-Herzegovina</b>		12.390		
<b>Kosovo</b>		6.350	68	100

Reference: Eurostat, 2020.

The table above contains the most recent data on textile waste. Accordingly, the amount of textile waste in Europe (28 countries) is 2,190,000 tons in 2016. Turkey is determined to have 206.442 tons.

**Table 11- European Countries Wood Waste by Years**

<b>Region (Tons)</b>	<b>2010</b>	<b>2012</b>	<b>2014</b>	<b>2016</b>
<b>Europe (28 Countries)</b>	<b>60.020.000</b>	<b>56.690.000</b>	<b>51.990.000</b>	<b>54.740.000</b>
<b>Belgium</b>	2.820.172	2.980.026	3.382.031	3.723.370
<b>Bulgaria</b>	115.129	201.287	265.736	316.594
<b>Čzechia</b>	302.503	237.816	197.001	243.239
<b>Denmark</b>	304.087	297.531	856.390	567.909
<b>Germany</b>	10.811.948	11.712.778	11.933.261	12.739.432
<b>Estonia</b>	871.299	816.433	551.233	434.277
<b>Ireland</b>	507.977	204.092	318.421	296.419
<b>Greece</b>	349.810	120.974	91.782	94.996
<b>Spain</b>	1.623.798	1.246.941	1.071.744	1.069.621
<b>France</b>	8.945.056	6.051.260	6.154.461	6.414.484
<b>Croatia</b>	174.483	97.097	91.069	92.889
<b>Italy</b>	3.759.996	3.847.633	4.338.715	4.486.957
<b>Cyprus</b>	24.032	6.205	3.966	4.395
<b>Letonia</b>	86.820	55.677	79.084	70.357
<b>Lithuania</b>	300.265	181.633	125.753	142.816
<b>Luxembourg</b>	111.181	87.385	79.653	149.338
<b>Hungary</b>	287.133	241.504	143.445	159.293
<b>Malta</b>	8.172	13.363	14.601	10.098
<b>The Netherlands</b>	2.568.304	2.575.974	2.576.366	2.630.635
<b>Austria</b>	1.294.506	887.657	1.170.038	1.658.305
<b>Poland</b>	3.507.510	3.949.300	3.864.365	2.565.358
<b>Portugal</b>	373.381	301.141	254.016	333.295
<b>Romania</b>	2.339.539	2.072.320	2.289.602	3.283.624
<b>Slovenia</b>	333.880	338.655	275.470	148.184
<b>Slovakia</b>	239.130	400.756	253.735	414.153
<b>Finland</b>	12.281.326	11.940.980	4.230.770	4.738.039
<b>Sweden</b>	1.863.353	1.170.837	1.465.971	1.905.525
<b>United Kingdom</b>	3.816.092	4.650.950	5.910.857	6.043.084



<b>Iceland</b>	16.972	16.058	17.755	25.157
<b>Liechtenstein</b>	3.650	2.084	794	1.760
<b>Norway</b>	1.205.702	1.409.417	770.348	855.518
<b>Montenegro</b>		2.635	9.174	12.225
<b>Northern Macedonia</b>	6.255	1.998	1.420	179.930
<b>Serbia</b>	27.129	53.963	57.834	97.507
<b>Turkey</b>	<b>175.542</b>	<b>181.024</b>	<b>268.208</b>	<b>338.166</b>
<b>Bosnia-Herzegovina</b>		237.225		
<b>Kosovo</b>		1.618	1.280	1.685

Reference: Eurostat, 2020.

The table contains the most up-to-date wood waste data obtained. Accordingly, the amount of wood waste in Europe (28 countries) is 54,740,000 tons in 2016. The amount of wood waste of Turkey in 2016 was determined as 338,166 tons.

**Table 12- European Countries Plastic Waste Amount by Years**

Region (Tons)	2010	2012	2014	2016
<b>Europe (28 Countries)</b>	<b>14.150.000</b>	<b>15.020.000</b>	<b>17.260.000</b>	<b>17.590.000</b>
<b>Belgium</b>	716.165	651.775	1.395.458	715.623
<b>Bulgaria</b>	59.950	99.922	196.124	213.449
<b>Čzechia</b>	253.923	325.623	347.929	430.416
<b>Denmark</b>	78.548	104.816	98.820	114.585
<b>Germany</b>	2.288.466	2.530.498	2.704.367	2.734.235
<b>Estonia</b>	25.390	22.706	32.966	42.836
<b>Ireland</b>	335.134	121.812	183.148	148.536
<b>Greece</b>	226.992	133.232	192.248	256.905
<b>Spain</b>	1.465.233	1.142.921	1.105.552	731.064
<b>France</b>	1.436.697	1.646.794	1.729.628	1.837.585
<b>Croatia</b>	24.807	39.186	49.116	65.131
<b>Italy</b>	2.141.461	2.781.865	3.215.966	3.931.868
<b>Cyprus</b>	83.994	4.243	5.242	6.222
<b>Letonia</b>	8.116	21.576	23.397	61.891
<b>Lithuania</b>	39.960	50.638	73.131	88.744
<b>Luxembourg</b>	27.304	26.329	26.325	28.917
<b>Hungary</b>	151.480	185.787	243.630	221.334
<b>Malta</b>	3.520	4.359	5.638	8.658
<b>The Netherlands</b>	518.143	574.632	570.769	521.658
<b>Austria</b>	564.604	357.595	371.417	371.236
<b>Poland</b>	863.236	969.653	1.188.512	1.296.322
<b>Portugal</b>	165.192	176.396	232.192	307.204
<b>Romania</b>	407.225	488.164	345.617	280.235
<b>Slovenia</b>	56.280	47.777	61.829	59.273





Slovakia	111.327	108.140	124.269	148.697
Finland	71.352	91.349	116.859	87.361
Sweden	218.839	175.836	301.187	315.976
United Kingdom	1.809.985	2.133.235	2.320.533	2.568.031
Iceland	4.358	6.427	5.553	7.975
Liechtenstein	365	173	207	336
Norway	88.845	157.859	244.118	244.217
Montenegro		130	4.104	2.975
Northern Macedonia	4.031	10.860	8.792	24.591
Serbia	6.820	17.854	27.553	55.076
Turkey	<b>217.310</b>	<b>214.580</b>	<b>223.381</b>	<b>658.164</b>
Bosnia-Herzegovina		1.867		
Kosovo		877	4.206	4.625

Reference: Eurostat, 2020.

The table contains the most up-to-date plastic waste data obtained. Accordingly, the amount of plastic waste in Europe (28 countries) is 17.590.000 tons in 2016. The amount of plastic waste of Turkey in 2016 was determined as 658,164 tons.

Table 13- European Countries Paper and Cardboard Waste Amount by Years

Region (Tons)	2010	2012	2014	2016
Europe (28 Countries)	<b>51.950.000</b>	<b>49.620.000</b>	<b>50.390.000</b>	<b>50.660.000</b>
Belgium	4.325.031	3.922.147	4.273.143	3.580.663
Bulgaria	160.314	201.539	416.332	374.893
Czechia	689.918	702.468	789.086	923.276
Denmark	1.038.474	895.131	824.143	779.409
Germany	8.061.989	8.183.517	8.099.736	7.960.794
Estonia	79.587	94.676	91.423	91.629
Ireland	745.887	337.354	520.568	665.952
Greece	651.665	521.713	480.210	526.586
Spain	3.843.107	3.598.612	3.087.327	3.531.138
France	7.005.000	7.348.000	7.203.541	7.319.000
Croatia	144.139	200.446	220.951	267.044
Italy	5.351.995	4.965.073	5.137.112	5.304.638
Cyprus	145.521	44.440	43.900	51.332
Letonia	45.167	106.212	108.492	137.560
Lithuania	104.747	123.942	171.743	165.670
Luxembourg	124.844	109.323	94.172	89.227
Hungary	585.078	538.301	761.911	713.579
Malta	11.530	10.557	16.717	18.926
The Netherlands	2.652.242	2.313.698	2.168.480	2.202.638
Austria	1.936.505	1.841.067	1.440.713	1.478.821
Poland	1.009.020	1.134.822	1.395.275	1.855.881



<b>Portugal</b>	976.921	968.314	931.204	905.137
<b>Romania</b>	563.124	671.252	506.379	547.071
<b>Slovenia</b>	133.515	129.858	139.754	187.822
<b>Slovakia</b>	192.049	221.959	242.589	258.611
<b>Finland</b>	767.491	649.058	630.640	570.457
<b>Sweden</b>	1.279.994	744.403	1.130.150	1.016.020
<b>United Kingdom</b>	9.322.355	9.046.642	9.463.587	9.138.942
<b>Iceland</b>	19.606	22.709	27.704	34.601
<b>Liechtenstein</b>	5.990	9.150	5.695	6.459
<b>Norway</b>	676.247	804.938	776.954	749.612
<b>Montenegro</b>		2.380	13.487	10.779
<b>Northern Macedonia</b>	2.362	3.095	483.859	42.441
<b>Serbia</b>	20.227	58.339	98.305	202.335
<b>Turkey</b>	<b>353.593</b>	<b>435.563</b>	<b>533.678</b>	<b>1.406.435</b>
<b>Bosnia-Herzegovina</b>		4.989		
<b>Kosovo</b>		725	3.037	4.589

Reference: Eurostat, 2020.

The table contains the most recent paper and cardboard waste data obtained. Accordingly, the amount of paper and cardboard waste in Europe (28 countries) was 50,660,000 tons in 2016. The paper and cardboard waste amount of Turkey in 2016 was determined as 1.406.435 tons.

**Table 14- European Countries The Amount of Recyclable Waste by Years**

<b>Region (Tons)</b>	<b>2010</b>	<b>2012</b>	<b>2014</b>	<b>2016</b>
<b>Europe (28 Countries)</b>	<b>245.900.000</b>	<b>240.740.000</b>	<b>239.940.000</b>	<b>246.130.000</b>
<b>Belgium</b>	16.007.766	12.045.992	13.536.038	12.768.399
<b>Bulgaria</b>	1.708.337	1.925.085	2.370.564	2.049.372
<b>Çzechia</b>	4.322.691	4.808.611	4.500.553	5.109.310
<b>Denmark</b>	3.371.293	3.170.919	3.528.233	3.082.193
<b>Germany</b>	34.549.788	37.283.685	38.860.736	39.380.869
<b>Estonia</b>	1.623.569	1.492.849	1.263.107	1.143.422
<b>Ireland</b>	3.249.123	1.284.266	1.434.386	1.662.838
<b>Greece</b>	2.653.652	2.000.459	1.125.064	2.128.339
<b>Spain</b>	11.555.976	13.352.299	12.345.888	12.559.306
<b>France</b>	34.330.985	33.735.163	34.499.195	34.898.422
<b>Croatia</b>	832.197	781.475	904.420	982.192
<b>Italy</b>	26.134.378	25.480.073	26.113.675	28.102.050
<b>Cyprus</b>	348.898	81.198	76.359	90.233
<b>Letonia</b>	227.862	311.910	331.184	396.058
<b>Lithuania</b>	1.124.961	903.235	1.066.287	1.086.934
<b>Luxembourg</b>	435.607	434.383	383.363	515.149
<b>Hungary</b>	3.135.064	2.936.950	3.230.318	2.790.811
<b>Malta</b>	56.676	63.112	82.875	78.390



<b>The Netherlands</b>	8.879.065	8.437.523	8.456.592	8.393.719
<b>Austria</b>	5.932.862	5.581.141	5.825.952	6.491.363
<b>Poland</b>	11.428.952	12.630.990	13.933.574	13.562.857
<b>Portugal</b>	3.302.115	3.552.836	3.968.112	4.131.308
<b>Romania</b>	5.284.458	5.126.758	4.804.661	5.819.169
<b>Slovenia</b>	942.886	952.837	1.222.752	949.641
<b>Slovakia</b>	1.621.620	1.644.128	1.490.982	2.261.338
<b>Finland</b>	14.392.794	13.456.696	5.716.157	6.280.460
<b>Sweden</b>	6.339.770	5.587.346	5.440.160	6.305.862
<b>United Kingdom</b>	42.105.895	41.677.745	43.429.979	43.113.943
<b>Iceland</b>	89.696	90.962	110.664	139.690
<b>Liechtenstein</b>	27.488	23.091	15.835	18.537
<b>Norway</b>	2.611.544	3.440.196	2.762.942	2.839.212
<b>Montenegro</b>		9.975	54.358	36.476
<b>Northern Macedonia</b>	45.820	40.434	1.005.624	577.462
<b>Serbia</b>	148.502	269.204	378.425	813.482
<b>Turkey</b>	<b>2.096.047</b>	<b>2.605.930</b>	<b>2.802.733</b>	<b>5.220.351</b>
<b>Bosnia-Herzegovina</b>		332.687		
<b>Kosovo</b>		18.450	61.383	112.639

Reference: Eurostat, 2020.

The table contains the most recent data on recyclable waste obtained. Accordingly, the amount of recyclable waste in Europe (28 countries) was 246.130.000 tons in 2016. The amount of recyclable waste of Turkey in 2016 was determined as 5,220,351 tons.

**Table 15- European Countries Ferrous Metal Waste by Years**

<b>Region (Ton)</b>	<b>2010</b>	<b>2012</b>	<b>2014</b>	<b>2016</b>
<b>Europe (28 Countries)</b>	<b>74.410.000</b>	<b>74.520.000</b>	<b>74.150.000</b>	<b>74.970.000</b>
<b>Belgium</b>	5.748.046	2.442.205	2.020.292	2.236.044
<b>Bulgaria</b>	297.441	526.760	586.553	694.276
<b>Çzechia</b>	2.441.967	2.871.772	2.508.170	2.829.541
<b>Denmark</b>	1.028.481	1.081.300	1.031.780	798.223
<b>Germany</b>	8.266.450	9.235.282	10.227.808	9.788.956
<b>Estonia</b>	532.194	450.939	465.763	464.573
<b>Ireland</b>	1.111.149	197.965	164.709	209.629
<b>Greece</b>	1.101.274	970.274	160.412	827.951
<b>Spain</b>	2.055.747	4.460.421	4.570.395	4.363.635
<b>France</b>	11.015.956	12.183.000	12.726.000	12.726.001
<b>Croatia</b>	361.158	335.364	409.299	388.674
<b>Italy</b>	9.818.994	9.234.009	8.312.763	8.623.938
<b>Cyprus</b>	12.358	7.111	6.589	6.484
<b>Letonia</b>	42.149	15.320	15.462	8.469
<b>Lithuania</b>	483.494	333.503	477.157	441.369



<b>Luxembourg</b>	81.060	127.894	97.353	146.890
<b>Hungary</b>	1.472.936	1.267.405	1.540.959	1.338.015
<b>Malta</b>	3.391	4.759	19.728	25.017
<b>The Netherlands</b>	1.230.035	1.334.036	1.446.789	1.241.972
<b>Austria</b>	1.427.171	1.787.720	2.164.615	2.253.262
<b>Poland</b>	4.690.406	5.179.937	5.387.954	5.775.730
<b>Portugal</b>	882.170	992.804	1.710.257	1.738.951
<b>Romania</b>	1.533.835	1.379.544	1.221.895	1.148.184
<b>Slovenia</b>	334.471	257.570	596.174	363.067
<b>Slovakia</b>	901.465	760.380	700.613	1.121.328
<b>Finland</b>	536.566	303.956	349.808	352.274
<b>Sweden</b>	1.458.655	2.364.523	1.122.037	1.615.920
<b>United Kingdom</b>	15.538.211	14.410.042	14.108.438	13.440.520
<b>Iceland</b>	0	0	21.554	24.418
<b>Liechtenstein</b>	17.258	10.271	7.964	8.548
<b>Norway</b>	0	0	0	118.596
<b>Montenegro</b>		1.804	11.951	1.859
<b>Northern Macedonia</b>	22.945	15.306	341	0
<b>Serbia</b>	73.080	104.354	148.552	345.322
<b>Turkey</b>	<b>912.653</b>	<b>1.069.951</b>	<b>1.050.722</b>	<b>1.808.649</b>
<b>Bosnia-Herzegovina</b>		55.375		
<b>Kosovo</b>		3.506	51.360	85.565

Reference: Eurostat, 2020.

The table contains the most recent ferrous metal waste data obtained. Accordingly, the amount of ferrous metal waste in Europe (28 countries) was 74.970.000 tons in 2016. The amount of ferrous metal waste of Turkey in 2016 was determined as 1,808,649 tons.

**Table 16- European Countries Non-Ferrous Metal Waste by Years**

Region (Tons)	2010	2012	2014	2016
<b>Europe (28 Countries)</b>	<b>6.960.000</b>	<b>8.880.000</b>	<b>8.680.000</b>	<b>8.940.000</b>
<b>Belgium</b>	421.727	547.044	636.495	694.459
<b>Bulgaria</b>	29.210	95.600	126.940	96.151
<b>Čzechia</b>	101.789	190.391	144.132	153.932
<b>Denmark</b>	82.186	88.209	93.240	73.962
<b>Germany</b>	942.102	1.283.695	1.244.174	1.228.155
<b>Estonia</b>	27.811	25.916	27.172	31.951
<b>Ireland</b>	53.736	20.774	27.151	24.505
<b>Greece</b>	60.406	50.637	50.897	135.930
<b>Spain</b>	262.506	655.568	437.920	450.692
<b>France</b>	529.770	1.162.500	1.048.654	853.370



Croatia	46.356	21.044	24.021	23.751
Italy	1.062.238	1.021.982	1.033.359	1.245.942
Cyprus	18.173	3.316	2.718	2.753
Letonia	130	7.492	1.973	7.304
Lithuania	17.159	15.746	20.597	27.739
Luxembourg	11.742	6.084	6.704	12.242
Hungary	175.365	185.515	120.021	125.720
Malta	2.823	2.959	3.831	3.053
The Netherlands	286.652	240.585	281.832	255.179
Austria	256.509	292.151	234.309	282.555
Poland	224.019	224.399	398.166	500.133
Portugal	152.043	161.211	127.422	170.206
Romania	84.363	56.927	68.797	90.896
Slovenia	12.630	74.572	27.070	51.976
Slovakia	46.953	32.846	40.188	66.015
Finland	102.395	34.231	101.639	57.546
Sweden	142.039	256.037	108.487	148.118
United Kingdom	1.805.443	2.120.298	2.246.710	2.128.755
Iceland	769	743	1.440	1.485
Liechtenstein	0	17	47	120
Norway	0	0	0	266.690
Montenegro		1.848	616	925
Northern Macedonia	684	1.103	272	355
Serbia	5.292	7.239	14.131	32.844
Turkey	<b>146.294</b>	<b>137.792</b>	<b>127.941</b>	<b>148.589</b>
Bosnia-Herzegovina		11.142		
Kosovo		76	223	15.541

Reference: Eurostat, 2020.

The table contains the most up-to-date non-ferrous metal waste data obtained. Accordingly, the amount of non-ferrous metal waste in Europe (28 countries) was 8.940.000 tons in 2016. The non-ferrous metal waste amount of Turkey was determined to be 148,589 tons in 2016.

**Table 17- European Countries The Amount of Ferrous and Non-Ferrous Metal Waste by Years**

Region (Tons)	2010	2012	2014	2016
<b>Europe (28 Countries)</b>	<b>16.270.000</b>	<b>13.690.000</b>	<b>13.740.000</b>	<b>14.670.000</b>
Belgium	634.475	381.905	459.582	401.032
Bulgaria	935.470	690.372	633.668	109.882
Čzechia	130.159	26.575	81.543	55.074
Denmark	628.500	478.813	410.824	510.895
Germany	484.483	543.847	596.272	571.007



<b>Estonia</b>	30.097	19.281	25.433	14.485
<b>Ireland</b>	268.375	99.108	69.173	127.419
<b>Greece</b>	123.452	92.330	74.144	132.814
<b>Spain</b>	677.906	744.758	644.037	885.278
<b>France</b>	2.239.274	2.154.500	2.590.434	2.610.920
<b>Croatia</b>	21.204	23.528	37.766	57.256
<b>Italy</b>	672.749	511.422	533.095	647.454
<b>Cyprus</b>	2.859	2.172	1.272	2.679
<b>Letonia</b>	26.839	68.553	47.779	39.185
<b>Lithuania</b>	94.926	94.046	92.558	101.727
<b>Luxembourg</b>	5.819	5.912	5.515	8.213
<b>Hungary</b>	268.152	296.682	201.552	23.949
<b>Malta</b>	23.604	22.452	15.083	2.369
<b>The Netherlands</b>	816.870	585.749	624.061	714.355
<b>Austria</b>	0	0	0	0
<b>Poland</b>	94.538	77.490	117.422	160.863
<b>Portugal</b>	190.900	305.395	156.575	159.846
<b>Romania</b>	119.209	138.744	91.168	121.641
<b>Slovenia</b>	17.162	45.896	31.130	38.536
<b>Slovakia</b>	41.054	31.301	37.321	125.155
<b>Finland</b>	443.403	276.496	175.659	305.280
<b>Sweden</b>	1.017.158	547.893	817.578	967.446
<b>United Kingdom</b>	6.260.016	5.423.405	5.166.996	5.776.093
<b>Iceland</b>	35.435	36.479	21.007	32.541
<b>Liechtenstein</b>	0	429	182	165
<b>Norway</b>	385.111	924.250	814.631	418.975
<b>Montenegro</b>		157	2.232	4.125
<b>Northern Macedonia</b>	5.440	3.419	198	328.154
<b>Serbia</b>	5.157	11.799	11.340	18.979
<b>Turkey</b>	<b>136.654</b>	<b>298.007</b>	<b>287.891</b>	<b>348.591</b>
<b>Bosnia-Herzegovina</b>		3.224		
<b>Kosovo</b>		4.099	118	47

Reference: Eurostat, 2020.

The table contains the most up-to-date ferrous and non-ferrous metal waste data obtained. Accordingly, the amount of ferrous and non-ferrous metal waste in Europe (28 countries) was 14.670.000 tons in 2016. The amount of ferrous and non-ferrous metal waste of Turkey in 2016 was determined as 348.591 tons.



## 3.2.2 Good Practices Examples

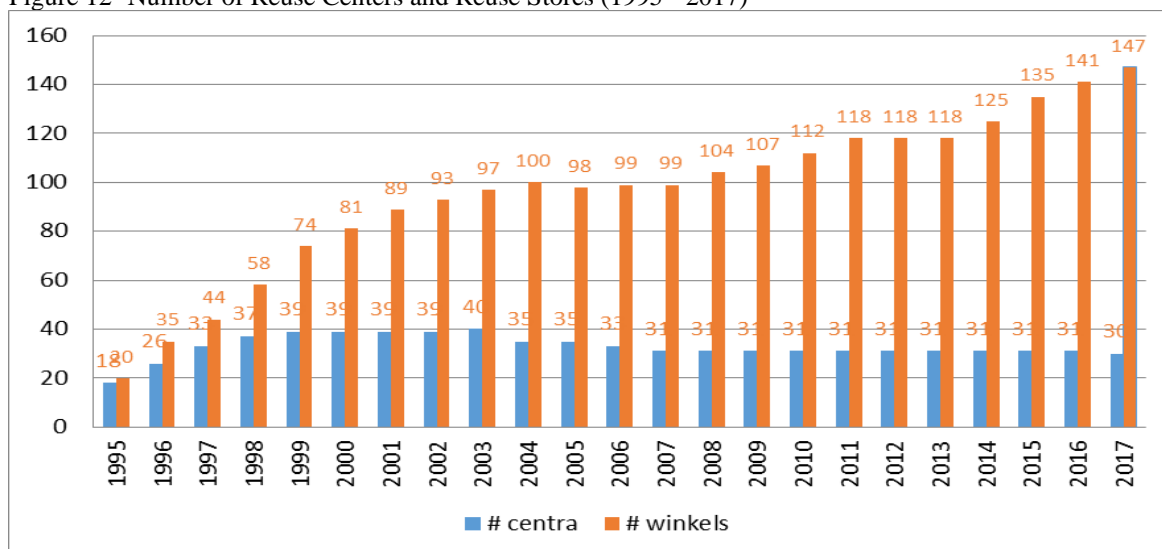
### 3.2.2.1 Belgium- Flander Example

Flander is a historic region on the North Sea coast, consisting of the former Shire of Flandra and the surrounding lands. Flander has a population of about 6.5 million. The area size is 13,599 km<sup>2</sup>. The population density in the region is 480 people per km<sup>2</sup>. There is a total of 308 municipalities in the region. When the economic structure of the region is examined, it is seen that it is industrialized, and advanced environmental policies are implemented.

The annual waste amount per capita in the region is 469 kg, the amount of residual waste is 146 kg and the amount of waste collected in the separation was determined as 324 kg. When the amount of waste collected in the region is compared, it was observed that, since 1997, more waste has been collected at its source and used for recycling and re-use. 69% of the waste was treated as reuse, recycling and compost, while 31% were sent to landfills or disposed of by energy recovery. It is among the regions that develop improvement activities that will take this mechanism further, with various projects and policies, especially since reuse provides a significant reduction in waste and CO<sub>2</sub> emissions and is a serious employment creation activity.

The following figure shows the distribution of reuse centers and stores in Belgium by years.

Figure 12- Number of Reuse Centers and Reuse Stores (1995 - 2017)



Reference: Reuse Centre Hageland, 2020.

Reuse activities, which started in 1995, include 30 reuse centers as of 2017 and 147 stores where products from these centers are offered for sale, including electrical appliances, household goods, etc. These activities in Belgium have many environmental, social and economic contributions.

Environmental Impact on Protection:



- Waste generation is prevented by encouraging reuse and extending the life of household items.
- Thanks to the sale of reusable goods, 34,582 tons (2018) of CO<sub>2</sub> emissions were prevented.

**Social Employment Impact:**

- Employment has been created for low-skilled and long-term unemployed workers.
- Reuse centers offer jobs, training and future opportunities to more than 5,659 people.

**Social Protection Impact:**

- Poverty reduction is provided by providing quality household items suitable for people living on a limited budget.
- More than 6 million customers bought products from these stores opened.

In addition, as of 2017, a total of 4,316 people are employed in the stores.

### **3.2.2.2 Germany Example**

EU Circular Economy policy aims to transform waste management into resource management. The claim that waste can be a useful raw material and energy source has been on the agenda for quite some time. Metals, glasses and textiles are ideal products for recycling. People are made aware of the necessity of waste separation. This contributed to the increase in the recovery rate. In addition, the use of new technologies in waste management has increased recycling.

Today, 14% of the raw materials used by the German industry are recycled as waste. Therefore, it causes a decrease in extraction levels and associated environmental effects. Modern closed loop management contributes approximately 20% in meeting the German Kyoto targets for reducing climate-related emissions.

The waste management industry has become a large and powerful economic sector in Germany. An annual turnover of approximately 40 billion Euros is produced in the sector and approximately 200,000 people are employed in approximately 3,000 companies. 15,000 facilities in Germany contribute to resource efficiency with recycling and recovery procedures. There are high recycling rates of around 60% for municipal waste, 60% for commercial waste and 90% for construction and demolition waste.

Since June 1, 2005: wastes are not stored without pre-processing. This process is carried out in pre-treatment incineration plants or mechanical-biological treatment plants.

Pre-treatment and stopping the use of wild landfills our health and climate. Landfills emit landfill gas, which contains methane and carbon dioxide. Landfill gas methane harms the climate 21-25 times more than carbon dioxide. Harmful leachate emission to groundwater is one of humanity's additional problems in landfills. Waste pre-treatment results in better leachate qualities. The German waste management system is fully funded by fees. There is no incentive. There is a 'polluter pays' principle, which means the producer has to pay for waste treatment or disposal.



Municipal and private waste management companies (Waste collection, recovery and disposal) work with various main stakeholder groups in waste management. Municipal waste management companies are responsible for biowaste and residual waste (Domestic waste). Private waste management companies are responsible for waste recycling (Domestic waste; commercial waste).

Germany's waste recycling rates are among the highest in the world. This shows how the waste industry contributes to sustainable economic production and management in Germany by saving raw materials and primary energy. The share of waste that cannot be collected must be sent for disposal without harming the environment or human health. Organic wastes must always undergo mechanical-biological or thermal treatment in order to be neutralized. Thus, it helps to reduce drainage water leaks and waste gas waste. Since June 2005, it is not allowed to sediment organic wastes without prior processing. There are approximately 70 incinerators with a capacity of 20 million tons in Germany for the treatment of residual waste. In addition, there are 4.6 million tons of incineration capacity in 30 incinerators. There are 44 facilities with a capacity of approximately 5.5 million tons for the mechanical-biological treatment of waste.

### **3.2.2.3 Sweden Example**

With a population of 10 million, Sweden is one of the most important countries in the world in ecological awareness and waste management. Sweden recycles 99% of its domestic waste. The target for 2020 is zero waste. With 50% of the waste, the energy required for local heating and remote cooling processes is generated. Sweden receives garbage by payment from Norway and neighboring countries in this regard. These countries reduce their costs by having their incineration operations done in Sweden, and take back the metal ashes formed as a result of incineration.

Zero waste does not mean that no waste or garbage will be generated. On the contrary, the act of consumption and the amount of waste generated with it are increasing. Certainly, this is an important problem and humanity must work to reduce the amount of waste generated. However, another important issue is what to do with these wastes. The most useful methods in this regard are recycling and generating energy from waste.

The amount of energy gained by incinerating 4 tons of garbage is equal to the energy provided by 1 ton of fuel. According to Swedish authorities, if garbage is constantly available and free, garbage disposal is a good investment. According to the authorities, turning garbage into energy is in a sense like turning them into gold.

Garbage is separated at the stage of collection from the houses, with the services provided by the municipality. Garbage is collected in separate garbage bins according to material types. Therefore, garbage cans are not uniform, they are separate, such as paper, glass, plastic. Thus, garbage is separated here. In Sweden, there is the right to access forest or natural areas. However, there are some rules. For example, it is forbidden to leave garbage behind. You should take the garbage formed in this area with you and remove it. It is known that this tradition, which has been going on for centuries, is not included in the Swedish Constitution. If garbage is left in a park, the police impose a fine on the person who left garbage. Of course, these behaviors are not gained only by imposing penalties. Education is also very important for this. Children learn from a very young age that they should not litter the environment.



There should also be incentives for waste collection. There are recycling machines available in almost every food store in Sweden for recycling all kinds of plastic and metal cans. When the bottles are placed in these machines, a token is taken from the machine. Shopping is done in these shops with the tokens received. Thanks to this incentive, the bottles or boxes thrown in the environment are collected and recycled. No bottles or boxes thrown around are seen.

### 3.3 Current Situation in Turkey and Good Practices Examples

#### 3.3.1 Current Situation

Solid wastes are evaluated in 14 categories. These categories and their contents are given in the table below:

**Table 18- Solid Waste Characterization Item Groups**

Materials	Descriptions
Kitchen, Park and Garden Waste	Leftovers, vegetables, fruit, park and garden waste
Bags	Shopping bags
Paper and Cardboard	All kinds of paper, corrugated and non-corrugated cardboard
Composite	Milk and juice box
Plastics	All kinds of plastic derivative waste other than plastic bottle
Plastic Bottle	Water and beverage bottles
Glass	All kinds of glass
Metals	All kinds of metal
Electronic Waste	Telephone, radio, etc.
Hazardous Wastes	Battery, paint can, medical waste, detergent box, medicine box
Diapers	Diapers and hygienic diapers
Textile	All kinds of textile materials
Other Flammables	Shoes, carpet, bags, belts, foam, food packaging, wood
Other Non-Flammables	Stone, dust, sand, ceramic, ash

Waste management practices, waste recycling and waste recovery are spreading rapidly in the world and in Turkey. In this direction, facilities, projects and investments for waste recycling have increased in Turkey in recent years.

**Table 19- Amount of Waste According to Disposal Method of Turkey**

Disposal and Recovery Method	2010		2012		2014		2016	
	Amount (Thousand Tons)	Percentage (%)	Amount (Thousand Tons)	Percentage (%)	Amount (Thousand Tons)	Percentage (%)	Amount (Thousand Tons)	Percentage (%)
<b>The Amount of Municipal Waste Collected</b>	<b>25.277</b>	<b>100</b>	<b>25.845</b>	<b>100</b>	<b>28.011</b>	<b>100</b>	<b>31.584</b>	<b>100</b>
<b>Sent to Municipal Garbage</b>	11.001	44	9.771	38	9.936	35	9.095	29



<b>Sent to Landfill</b>	13.747	54	15.484	61	17.807	65	19.338	62
<b>Incinerated in the Open</b>	134	1	105	0	4	0	10	0
<b>Poured into Stream and Lake</b>	44	0	33	0	16	0	1	0
<b>Buried</b>	34	0	94	0	7	0	7	0
<b>Disposal By Filling, Pouring On Land etc.</b>	122	0	202	1	114	0	41	0
<b>Sent to Compost Facility</b>	194	1	155	1	126	0	146	0
<b>Waste Sent to Licensed Facilities and Biogas Facilities for Waste Recovery</b>	-	-	-	-	-	-	2.946	9

Reference: TÜİK, 2020.

The current amount of waste obtained according to Turkey's waste disposal methods are given in the table. Accordingly, no waste was sent to licensed waste recovery facilities and biogas facilities in 2010, 2012 and 2014. In 2016, 2.946 thousand tons of waste was sent. This shows that waste is not used at the desired level in terms of recycling or recovery in Turkey. 62% of the municipal waste collected in 2016 was sent to the landfill facility. In 2016, only 9% of the total waste was sent to recovery and biogas facilities.

The amount of waste in proportion to population and industrialization in Turkey is steadily growing. However, the amount spent for waste management is also increasing. This adversely affects the environment and economy.

### 3.3.2 Good Practices Examples

#### 3.3.2.1 Edirne Solid Waste Management Association (EDIKAB) Example

Solid wastes have an important place both in human and environmental health and in economic terms in Turkey as in the whole world. There is a need for a planned solid waste management to eliminate solid wastes that need to be collected, transported, stored and disposed regularly in order to protect environmental health in urban areas without causing major problems.

The wild landfill system problem, which has been one of the biggest problems of Edirne for half a century, was solved with Edirne Landfill and Disposal Facility opened in 2017 by the Edirne Solid Waste Union consisting of the municipalities of Havsa, Lalapaşa, Süloğlu and Edirne Provincial Special Administration, which joined the union representing 96 villages under the leadership of Edirne Municipality. The facility is among the top 5 facilities in Turkey. The first lot volume of the facility is 950,000 cubic meters. While similar facilities were reimbursed by Manisa Metropolitan Municipality for 110 million TL, Çorum Municipality for 70 million TL, Edirne Municipality reimbursed this facility only for 10 million 100 thousand TL.



When it reaches full capacity, it will be able to produce electricity to meet the monthly electricity needs of 6,400 houses per day. EDİKAB has leased the facility operation to Atlas İnşaat Sanayi ve Ticaret Limited Şirketi for 29 years. Edirne Center, Havsa, Süloğlu, Lalapaşa and 96 villages benefits from the facility. EDİKAB does not pay disposal fees for waste. It is the first and only facility with this in Turkey. The Association will receive 10% of the turnover of the company that carries out the waste collection and disposal work with the agreement it has made.

According to the agreement made with the company ATLAS İnşaat San. Tic. Ltd. Şti., to whom it has given the operation of the facility for 29 years, EDİKAB will receive 10% of the turnover. This share will be distributed among the institutions based on the rate of waste brought to the facility. In this respect, it contains the principle of "considering waste (garbage) as a resource, not as a waste", which is one of the main conditions of waste management.

The equipment and personnel information of the institutions that collect waste for the facilities are shown in Table 2. As can be seen in the table, the amount of equipment and personnel employed varies according to the population and the area served. Although the information given in Table 2 is taken on the day of meeting with the authorities, it is possible to change over time. The important point here is to state that institutions vary according to the population of the province, district or rural area and the size of the area served.

### **3.4 Current Situation in Kırklareli Province**

#### **3.4.1 Kırklareli Geography**

Kırklareli is one of the provinces of our country with dense forests. Mountains constitute 48% of the provincial geography. The hills of the Yıldız Mountains (Strandzas), which form the most important elevation of the region, covered with dense forests, are the habitats of large game animals, and the plains are the living areas of poultry game animals. After the Yıldız Mountains, the bases of the valleys expand towards the Ergene Basin and almost all the plains of the region are gathered here. All of these plains are called "Ergene Plain". The plains cover the Vize, Pınarhisar, southern parts of Kırklareli center and the Pehlivan köy, Babaeski and Lüleburgaz fields.<sup>2</sup>

The basins of all Kırklareli streams are open. In other words, these rivers flow into open seas. Rivers show different characteristics in terms of basin, flow rate and regime. Yıldız Mountains divide the river basins into two because it is the "water section line". The creeks in the province are Ergene, Paşaköy Creek, Soğucak Creek, Lüleburgaz Creek, Babaeski creek, Teke Creek, Derin Geçit Creek, Bulank Creek, Pabuç Creek, Kazan Creek and Rezve Creek.

In the east of Kırklareli, the Black Sea is located. Salinity rate in the Black Sea is lower than in the Aegean and Mediterranean. The salinity of the surface waters is low due to the fact that the rivers flowing into the Black Sea carry large amounts of fresh water and the precipitation is abundant. While this rate is 018% in the middle part of the Sea, it is around 016% on the shores of Kızılköy and İğneada. Low salinity near İğneada facilitates the freezing of the waters.

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<sup>2</sup> (Kırklareli Provincial Directorate of Culture and Tourism, 2020)



Kırklareli climate differs according to the precincts. The continental climate is dominant in the center of Kırklareli. Black Sea climate is seen in the northern parts of Yıldız Mountains. Accordingly, the summers are cool and the winters are cold. The continental climate is observed in the inner parts far from the sea. Summers are hot, winters are cold and occasionally snowy.

Figure 13- Kırklareli Provincial Map



Reference: Google Visual, 2020.

### 3.4.2 Population

As of 2019, the share of the population of Kırklareli province in the total population of Turkey is 0.4%. Kırklareli province ranks 54th in Turkey in terms of population size. The population density of Kırklareli province is below Turkey average. As of 2019, it ranks 48th in Turkey in terms of population density. The amount of immigration received by Kırklareli is more than the amount of immigration it gives.

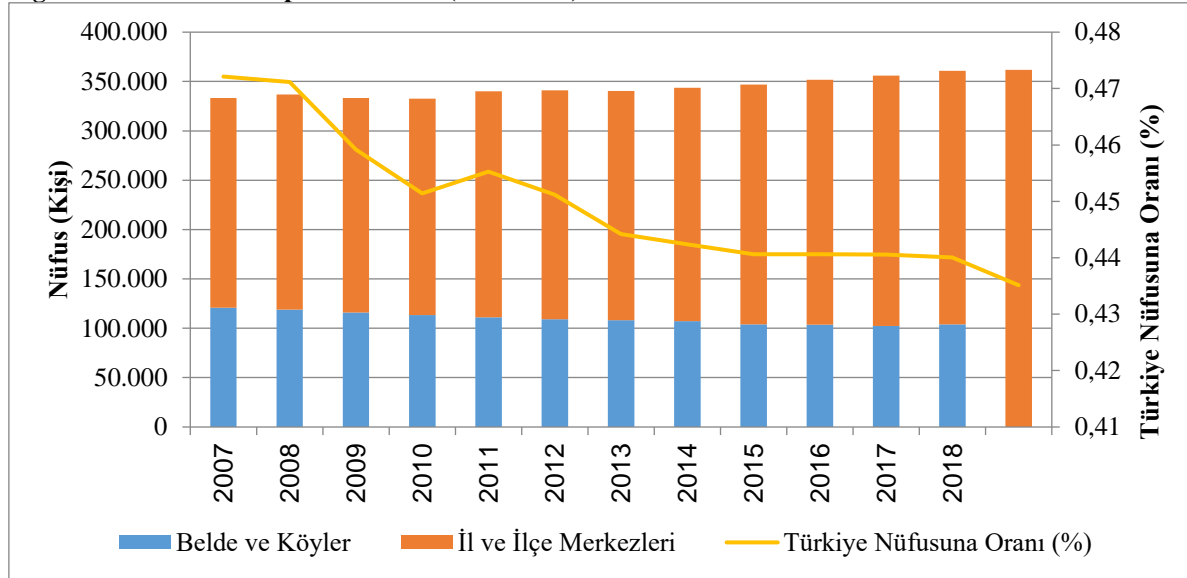
Table 20- Kırklareli Population Data (2007-2019)

Years	Kırklareli Province				Turkey Population
	Town and Villages	Province and District Centres	Total Population	Ratio of it to Turkey Population (%)	
2007	120.866	212.390	333.256	0,47	70.586.256
2008	118.871	218.071	336.942	0,47	71.517.100
2009	116.035	217.144	333.179	0,46	72.561.312
2010	113.458	219.333	332.791	0,45	73.722.988
2011	111.199	229.000	340.199	0,46	74.724.269
2012	109.064	232.154	341.218	0,45	75.627.384
2013	108.250	232.309	340.559	0,44	76.667.864
2014	107.221	236.502	343.723	0,44	77.695.904
2015	103.955	243.018	346.973	0,44	78.741.053
2016	103.667	248.017	351.684	0,44	79.814.871
2017	102.296	253.754	356.050	0,44	80.810.525

2018	104.110	256.750	360.860	0,44	82.003.882
2019	102.534	361.836	361.836	0,44	83.154.997

Reference: TÜİK, Results of the Address Based Population Registration System (ADNKS), 2020.

Figure 14- Kırklareli Population Data (2007-2019)



Reference: TÜİK, Results of the Address Based Population Registration System (ADNKS), 2020.

### 3.4.3 Environmental Pollution

#### 3.4.3.1 Air Pollution

In our country, the management of parameters related to outdoor air quality is carried out in accordance with the Air Quality Assessment and Management Regulation. In this context, information on air quality limit values valid as of 2019 is given in the table below.

Table 21- Gradual Reduction in Limit Values and Warning Thresholds in Air Quality Assessment and Management

Pollutant	Average Time	Limit Value		Warning Threshold
		2018	2019	
SO <sub>2</sub>	Hourly -for protection of human health-	380	350	500 µg/m <sup>3</sup> (measured in three consecutive hours in an entire "zone")
	24 hours -for protection of human health-	150	125	



	<b>Yearly and winter period</b> (From October 1 to March 31) -for protection of human health-	20	20	or "sub-zone" or at least in 100 km <sup>2</sup> - whichever is smaller - in representative areas of air quality)
NO <sub>2</sub>	<b>Hourly</b> -for protection of human health-	260	250	400 µg/m <sup>3</sup> (measured in three consecutive hours in an entire "zone" or "sub- zone" or at least in 100 km <sup>2</sup> -
	<b>Yearly</b> -for protection of human health-	44	40	
NO <sub>x</sub>	<b>Yearly</b> -for protection of vegetation-	30	30	----
PM <sub>10</sub>	<b>24 hours</b> -for protection of human health-	60	50	----
	<b>Yearly</b> -for protection of human health-	44	40	
Pb	<b>Yearly</b> -for protection of human health-	0,6	0,5	----
BENZENE	<b>Yearly</b> -for protection of human health -	8	7	----
CO	Maximum daily average of 8 hours -for protection of human health-	<b>10.000</b>	<b>10.000</b>	----

Reference: Air Quality Assessment and Management Regulation, 2020.

The comparison of air quality index for air quality is given in the table below.

Table 22- Comparison of Air Quality Index for Air Quality

Index	AQI	SO <sub>2</sub>	NO <sub>2</sub>	CO [µg/m <sup>3</sup> ]	O <sub>3</sub>	PM <sub>10</sub>
		1 H. Ave.	1 H. Ave.	8 H. Ave.	8 H. Ave.	24 H. Ave.
Good	0 – 50	0-100	0-100	0-5.500	0-120L	0-50
Intermediary	51 – 100	101-250	101-200	5.501-10.000	121-160	51-100
Sensitive	101 –	251-500	201-500	10.001-	161-180B	101-260

<b>Unhealthy</b>	151	–	501-850	501-1.000	16.001-	181-240U	261-400
<b>Bad</b>	201	–	851-1.100	1.001-	24.001-	241-700	401-520
<b>Hazardous</b>	301	–	>1.101	>2.001	>32.001	>701	>521

L: Limit Value

B: Information Threshold

U: Warning Threshold

**Table 23- Continuous Emission Measurement Systems in Kırklareli Province as of 2019**

Sector	No of Facilities	No of Flues
Woodworking Plants	-	-
Acid Production Plants	-	-
Waste Recovery and Disposal Facilities	1	<b>1</b>
Glass Manufacturing Factories	1	<b>2</b>
Cement	2	<b>3</b>
Iron-Steel and Metallurgy Factories	-	-
Natural Gas Cycle and Thermal Power Plants	4	<b>11</b>
Food Factories	3	<b>4</b>
Fertilizer Factories	-	-
Paper Factories	1	<b>1</b>
Chemistry Factories	-	-
Lime Factories	1	<b>2</b>
Tire Production Facilities	-	-
Automotive	-	-
Petroleum and Petrochemical Plants	-	-
Sugar Factories	-	-
Textile Factories	-	-
<b>TOTAL</b>	<b>13</b>	<b>24</b>

Reference: Kırklareli Province 2019 Environmental Status Report, 2020.

There are 4 air quality monitoring stations (Center, Lüleburgaz, Vize, İğneada) in Kırklareli.

**Table 24- Air Quality Measurement Station Locations and Measured Parameters in Kırklareli Province in 2019**

Station Locations			AIR POLLUTANTS				
Station Locations	Coordinates (Latitude; Longitude)	PM10	SO2	NO	NO2	NOX	O3
<b>Center-Kırklareli</b>	41° 43' 28" (latitude) 27° 12' 52" (longitude)	X	X	-	-	-	-
<b>Lüleburgaz</b>	41° 23' 52" (latitude) 27° 20' 45" (longitude)	X	X	X	X	-	-



Vize	410 35' 11" (latitude) 270 48' 48" (longitude)	X	X	X	X	X	-
İğneada-Limanköy	410 53' 06" (latitude) 280 03' 21" (longitude)	X	X	X	X	X	X
TOTAL DEVICE NUMBER		3	3	-	2	-	1

Reference: havaizleme.gov.tr, 2020.

**Tablo 25- Kırklareli Air Quality Monitoring Station in Kırklareli Province, 2019 Air Quality Parameters Monthly Average Values and Number of Days When Limit Value Exceeded (µg/m<sup>3</sup>; CO: mg/m<sup>3</sup>)**

STATION NAME	SO <sub>2</sub>	AGS*	PM <sub>10</sub>	AGS*	CO	AGS*	NO	AGS*	NO <sub>2</sub>	AGS*	NO <sub>x</sub>	AGS*	O <sub>3</sub>	AGS*
January	22,86		35,25											
February	6,52		56,49											
March	7,99		58,78											
April	5,75		48,05											
May	1,44		40,26											
June	3,68		36,87											
July	4,05		42,66											
August	4,31		36,99											
September	3,60		46,44											
October	5,14		48,39											
November	3,37		35,66											
December	6,21		31,72											

\*AGS: The number of days the limit value is exceeded

Reference: havaizleme.gov.tr, 2020.

Industrial branches operating throughout the province of Kırklareli show a great variety. Air pollution caused by the industry mainly occurs as a result of wrong location selection, improper fuel use and discharge of waste gases to the receiving environment without taking adequate technical measures. In the province, air pollution is mainly caused by the use of fuel for heating in residences and workplaces, the use of fuel for energy generation in industrial facilities, and emissions from motor vehicle exhausts and activities such as crushing, screening, and sizing that cause dust emissions. Air pollution caused by these sources is also affected by geographical location, unplanned urbanization and meteorological factors.

While the air quality in a large part of Thrace has decreased noticeably due to intensive industrialization and coal use, only in Vize district of Kırklareli and Karaağaç districts of Edirne, air quality was at good values in 2019. While the air quality in Vize, which has wide forest areas, is described as clean with a value of 4.6 micrograms, Karaağaç was the settlement with the cleanest air after Vize with a value of 12.1 micrograms.

### 3.4.3.2 Water Pollution

Ergene Streamlet, which is a branch of Meriç River, is the largest river in Kırklareli. It comes out of the Istranca (Yıldız) Mountains and enters the provincial borders of Edirne near Pehlivan köyü, with its many branches covering a route of 80 km. The streamlet, which frequently overflows, has little water in summer and a lot in winter and autumn. Paşaköy, Lüleburgaz, Sulucak and Şeytan Creeks join the Ergene Streamlet. Rezve Creek: It comes out of Istranca (Yıldız) Mountains and has a fast flow. It forms the Turkish-Bulgarian border.

With the unplanned industrialization, population growth, domestic wastewater discharge and unconscious agricultural practices threatening the soil in the Ergene Basin, the quality of the surface and ground waters of the Ergene Basin has been extremely degraded, highly polluted and has come to the point of loss.

The pollution reasons of the creeks connected with the borders of Kırklareli province are summarized in the table below.

**Table 26- Pollution Causes of Creeks in Kırklareli Province**

Water Resource	Pollution Causes			
	Domestic Liquid Waste	Domestic Solid Waste	Industrial Wastes	Agricultural Activities
Ergene River and Its Branches	X	X	X	X
Havsa Creek	X	X	X	X
Şeytan Creek	X		X	X
Turgutbey Creek	X		X	X
Lüleburgaz Creek	X	X	X	X
Uğurlu Creek			X	X
B.Karıştıran Creek		X	X	X
Evrensekiz Creek	X	X	X	X
Lişko Creek	X		X	X

Reference: Kırklareli Province 2019 Environmental Status Report, 2020.

### 3.4.3.3 Domestic Waste Pollution

**Table 27- Solid Waste Components Collected by Provincial / District Municipalities in Kırklareli Province for 2018**

Solid Waste Components	Percentage (%)
<b>Kitchen Waste</b>	39,42
<b>Paper</b>	2,68
<b>Cardboard</b>	5,65
<b>Bulky Cardboard</b>	0
<b>Plastics</b>	14,13





<b>Glass</b>	<b>7,80</b>
<b>Metal</b>	<b>0,92</b>
<b>Bulky Metal</b>	<b>0</b>
<b>Waste Electrical and Electronic Equipment</b>	<b>0</b>
<b>Hazardous Waste</b>	<b>5,07</b>
<b>Park and Garden Waste</b>	<b>1,13</b>
<b>Other Flammable Wastes</b>	<b>0</b>
<b>Other Flammable Bulky Wastes</b>	<b>0</b>
<b>Others</b>	<b>16,16</b>
<b>Ash (Including dust, sand, stone)</b>	<b>7,04</b>
<b>TOTAL</b>	<b>100</b>

**Reference: Kırklareli Province 2019 Environmental Status Report, 2020.**

\*\*\* It has been stated that there is no characterization study for 2019 by Kırklareli Local Administrations Solid Waste Facilities Construction and Operation Association, and the data for 2018 are provided by the Association.

**Table 28- The Amount of Municipal Waste Collected by Provincial / District Municipalities and Managed by Local Governments (Metropolitan Municipality / Municipalities / Unions) in Kırklareli Province for 2019 and Methods of Collection, Transportation and Disposal (KIRK-KAB,2020)**

Metropolitan Municipality/Provincial/District Municipality or	Name of the Union Metropolitan Municipality /If Union, municipalities member to the Union	Population		Amount of Solid Waste Generated (ton/d)	Amount of Solid Waste Collected (Tons/day)		Average Solid Waste Generated Per Person (kg/day)		Number of Transfer Stations, if any	Who Carries out Waste Management Services? (Municipality (B), Private Sector (OS), Municipality Company (BŞ))	Existing Municipal Waste Management Facility				
		Summer	Winter		Summer	Winter	Summer	Winter			Landfill	Pre-Treatment (Mechanical Separation / Biodrying / Compost)	Incineration	Irregular Landfill	Energy Generation from Storage
<b>KIRKLARELİ LOCAL GOVERNMENT S CONSTRUCTION AND OPERATION OF SOLID WASTE PLANTS</b>	KIRKLARELİ	79.038	79.038	-	75.14	76.71	0.95	0.97	None	Municipality	2. smif				Exists
	BÜYÜKMAND	3.337	3.337	-	0.26	0.27	0.07	0.08	None	Municipality	2. smif				Exists
	DEMİRKÖY	3.375	3.375	-	1.49	1.23	0.44	0.36	None	Municipality	2. smif				Exists
	KAVAKLI	4.779	4.779	-	5.68	5.66	1.18	1.18	None	Municipality	2. smif				Exists
	KAYNARCA	2.101	2.101	-	0.14	0.7	0.19	0.33	None	Municipality	2. smif				Exists
	ALPULLU	2.134	2.134	-	0.32	0.2	0.15	0.09	None	Municipality	2. smif				Exists
	BABAESKİ	29.569	29.569	-	28.88	28.71	0.97	0.97	None	Municipality	2. smif				Exists
	KARAHALİL	1.435	1.435	-	0	0	0	0	None	Municipality	2. smif				Exists
	İÇNEADA	2.492	2.492	-	0	0	0	0	None	Municipality	2. smif				Exists
	KIYIKÖY	2.183	2.183	-	0	0	0	0	None	Municipality	2. smif				Exists
	ÜSKÜP	2.213	2.213	-	3.26	2.94	1.47	1.33	None	Municipality	2. smif				Exists
	KOFAZ	604	604	-	0.3	0.25	0.49	0.41	None	Municipality	2. smif				Exists
	İNECE	1.750	1.750	-	0.097	0.096	0.05	0.05	None	Municipality	2. smif				Exists
	VİZE	14.562	14.562	-	17.02	17.09	1.16	1.17	None	Municipality	2. smif				Exists
	LÜLEBURGAZ	119.460	119.46	-	94.48	89.34	0.79	0.75	1	Municipality	2. smif				Exists
	PINARHİSAR	11.088	11.088	-	6.96	11.18	0.63	1.01	None	Municipality	2. smif				Exists
	ÇAKILLI	1.991	1.991	-	0	0	0	0	None	Municipality	2. smif				Exists
	BÜYÜKKARIŞT	5.868	5.868	-	0	0	0	0	None	Municipality	2. smif				Exists
	AHMETBEY	3.832	3.832	-	0	0	0	0	None	Municipality	2. smif				Exists
	EVRENSEKİZ	2.835	2.835	-	0	0	0	0	None	Municipality	2. smif				Exists
	PEHLİVANKÖY	1.606	1.606	-	0	0	0	0	None	Municipality	2. smif				Exists
	SPECIAL	65.584	65.584	-	20.18	16.28	0.31	0.25	None	Special	2. smif				Exists
Province-Wide		361.836	361.836	-	254.48	250.66	8.87	8.959							

In 2019, 32,897 primary-secondary and high school students were trained within the scope of Zero Waste Management in Kırklareli Center, District and village schools. In addition, the necessary trainings were provided by the personnel of Kırklareli Provincial Directorate of Environment and Urbanization to the public institutions that requested.

**Table 29- The Amount of Waste Collected Under Zero Waste Management in 2019 (Central District)**

Center	Amount of Waste Collected (Kg)
Paper, cardboard (15 01 01, 15 01 05, 20 01 01)	9.914
Plastic (15 01 02, 15 01 05, 17 02 03, 20 01 39)	4.415
Metal (15 01 04, 17 04 07, 20 01 40)	1.645
Glass (15 01 07, 17 02 02, 20 01 02)	222.389
Organic waste	134
Mixed (plastic, paper, glass, metal)	21.384
<b>TOTAL</b>	<b>259.881</b>

Reference: Sıfıratıkbilgisistemi.csb.gov.tr, 2020

**Table 30- The Amount of Waste Collected Under Zero Waste Management in 2019 (Lüleburgaz)**

Lüleburgaz	Amount of Waste Collected (Kg)
Paper, cardboard (15 01 01, 15 01 05, 20 01 01)	1.935
Plastic (15 01 02, 15 01 05, 17 02 03, 20 01 39)	40
Glass (15 01 07, 17 02 02, 20 01 02)	5
Toner-Cartridge (08 03 17*, 20 01 27*)	6
Lighting (20 01 21*)	4
Medicine (20 01 31*, 18 01 08*, 18 02 07*, 20 01 32)	401
Vehicle maintenance / repair (16 01 03, 16 01 07*)	120
Hazardous waste (20 01 13*, 20 01 14*, 20 01 15*, 20 01 17*, 20 01 19*, 20 01 27*, 20 01 29*, 20 01 37*)	4.552
Mixed (plastic, paper, glass, metal)	1.702
<b>TOTAL</b>	<b>8.765</b>

Reference: Sıfıratıkbilgisistemi.csb.gov.tr, 2020

**Table 31- The Amount of Waste Collected Under Zero Waste Management in 2019 (Pınarhisar)**

Pınarhisar	Amount of Waste Collected (Kg)
Paper, cardboard (15 01 01, 15 01 05, 20 01 01)	50
Organic waste	363
Mixed (plastic, paper, glass, metal)	171
<b>TOTAL</b>	<b>584</b>

Reference: Sıfıratıkbilgisistemi.csb.gov.tr, 2020



**Table 32- The Amount of Waste Collected Under Zero Waste Management in 2019 (Vize)**

Vize	Amount of Waste Collected (Kg)
Paper, cardboard (15 01 01, 15 01 05, 20 01 01)	11.340
Plastic (15 01 02, 15 01 05, 17 02 03, 20 01 39)	24.235
Metal (15 01 04, 17 04 07, 20 01 40)	168.400
Glass (15 01 07, 17 02 02, 20 01 02)	700
Wood (15 01 03, 17 02 01, 20 01 38)	32.300
Battery (16 06 01*)	200
Accumulator (16 06 02*, 16 06 03*, 16 06 04, 16 06 05, 20 01 33*, 20 01 34)	150
Lighting (20 01 21*)	150
Electrical and Electronic Equipment (20 01 23*, 20 01 35*, 20 01 36, 16 02 13*, 16 02 14*, 09 01 10, 09 01 11, 09 01 12)	4.427
Medicine (20 01 31*, 18 01 08*, 18 02 07*, 20 01 32)	23
Hazardous waste (20 01 13*, 20 01 14*, 20 01 15*, 20 01 17*, 20 01 19*, 20 01 27*, 20 01 29*, 20 01 37*)	34.400
Organic waste	63.650
Mixed (plastic, paper, glass, metal)	260
<b>TOTAL</b>	<b>340.235</b>

Reference: Sifiratikbilgisistemi.csb.gov.tr, 2020

**Table 33- Waste Processing and Amount in 2018 in Kırklareli Province \***

WASTE PROCESSING METHOD NAME		(kg)
R/D	R/D Name	
R1	Use as primary fuel or other means for energy production	<b>122279</b>
R2	Solvent reclamation / regeneration	<b>39403</b>
R3	Reclamation / recycling of organic materials not used as solvents (including compost and other biological recycling processes)	<b>4968160</b>
R4	Reclamation / recycling of metals and metal compounds	<b>257497</b>
R6	Regeneration of acids or bases	<b>398860</b>
R9	Re-refining or other reuse of used oils	<b>138532</b>
R12	Exchange of wastes to be subjected to any of the processes between R1 and R11	<b>6311387</b>
R13	Stockpiling of wastes until they are subjected to any of the processes specified between R1 and R12	<b>1530049</b>



D5	Landfill above or below ground requiring special engineering (cellular storage and so on, each separately isolated from the environment and covered and so on.)	<b>1850285</b>
D9	Physical-chemical treatments (e.g. evaporation, drying, calcination and the like) applied to the final compounds or mixtures disposed of by any of the processes D1 to D12 and not stated elsewhere in this annex)	<b>294519</b>
D10	<b>Incineration (on land)</b>	<b>276848</b>

(Waste Management Application, 2020)

### 3.4.4 Waste Potential That Can Be Used In The Region

There is an important potential regarding biomass energy production in the province where agricultural and animal production is important. Oilseed crops such as sunflower, rapeseed, soybean, canola, safflower, etc. are planted in Kırklareli province. In addition to these resources, energy forestry can be realized by planting qualified trees in the Yıldız Mountains. Animal and herbal wastes in forests within the provincial borders can also be considered as an important energy source.

The amount and potential energy amounts of the wastes mentioned in Kırklareli province are given in the tables below;

**Table 34- Animal Waste Biogas Potential**

<b>Total Fertilizer (tons / year)</b>	951.632
<b>Total Biogas Amount (m3 / year)</b>	24.865.729
<b>Biogas AID (kcal/m3)</b>	5.000
<b>Total Energy Value (MWh/yıl)</b>	144.568
<b>Combustion Efficiency</b>	60%
<b>Power Plant Annual Working Hours</b>	7.000
<b>Installed Power (MW)</b>	12
<b>Annual Electricity Generation (GW/h)</b>	87

Reference: (Trakyaka, 2017)

**Table 35: Urban Waste Electricity Generation Potential**

<b>Collected Waste (tons / year)</b>	144.389
<b>Installed Power (MW)</b>	3
<b>Annual Estimated Production (GW/h)</b>	17

Reference: (Trakyaka, 2017)

**Table 36 - Agricultural Waste Electricity Generation Potential**

<b>Total Paddy Stalk (tons / year)</b>	27.710
<b>Total Paddy Shell (tons / year)</b>	3.695
<b>Paddy stalk to be used for energy generation (tons / year)</b>	16.626

Paddy shell to be used for energy generation (tons / year)	2.217
Total wheat stalk (tons / year)	365.081
Wheat stalk to be used for energy generation (tons / year)	219.049
Total sunflower stalk (tons / year)	65.445
Sunflower stalk to be used for energy generation (tons / year)	39.267
Total amount of energy per year (Gcal)	758.257
Approximate cycle efficiency	40%
Total working hours per year	6.500
Approximate theoretical installed power (MW)	54
Annual electricity generation (GWh)	353

Reference: (Trakyaka, 2017)

Kırklareli province is the leading province of the Thrace region in terms of animal husbandry and agriculture. Due to its favorable geographical situation, animal husbandry and agriculture related to a wide range of agricultural products stand out in the region. In addition, Kırklareli has a place in the industrial sense with its proximity to Istanbul. Likewise, its location in the geography declared as a zone free from animal diseases has a positive effect in terms of the excess animal population.

**Table 37 - Animal Numbers in Kırklareli Province in 2018**

District / Number of Animals	Bovine	Ovine	Poultry
Center	41.231	187.881	320.390
Lüleburgaz	46.246	106.005	157.342
Babaeski	27.907	61.368	48.522
Vize	12.580	51.021	9.240
Pınarhisar	7.463	60.452	10.858
Demirköy	5.933	18.820	27.050
Pehlivan köy	3.037	8.405	7.109
Kofçaz	3.726	40.938	5.892
<b>TOTAL</b>	<b>148.123</b>	<b>534.890</b>	<b>586.403</b>

Reference – Kalaycı tax office (2019)

Considering the agricultural lands and animal numbers of the region, it is seen that animal wastes are an environmental problem, especially within the borders of Merkez, Lüleburgaz and Babaeski districts. In the light of the accepted data, the amount of waste generated only from bovine in these districts is approximately 1,650 tons/day, 1,850 tons/day and 1,116 tons/day, respectively. The fact that this waste are generated every day and the necessity of its disposal is an issue that needs careful attention.

In the light of the values given in Table 37, the annual waste amounts calculated according to 2018 data in the districts of Kırklareli province and the biogas generation potentials related to these wastes are given in Table 38.



**Table 38 - Waste amounts and biogas generation calculated according to 2018 data in districts of Kırklareli province**

District	Bovine Waste (tons/year)	Poultry Waste (tons/year)	Ovine Waste (tons/year)	Bovine Biogas (m <sup>3</sup> /year)	Poultry Biogas (m <sup>3</sup> /year)	Ovine Biogas (m <sup>3</sup> /year)
Center	451.479	17.541	154.297	14.898.822	1.368.225	8.949.242
Lüleburgaz	506.394	8.614	87.057	16.710.992	671.929	5.049.283
Babaeski	305.582	2.657	50.398	10.084.194	207.213	2.923.111
Vize	137.751	506	41.901	4.545.783	39.459	2.430.258
Pınarhisar	81.720	594	49.646	2.696.755	46.369	2.879.480
Demirköy	64.966	1.481	15.456	2.143.890	115.517	896.444
Pehlivanköy	33.255	389	6.903	1.097.420	30.359	400.351
Kofçaz	40.800	323	33.620	1.346.390	25.162	1.949.979
<b>TOTAL</b>	<b>1.621.947</b>	<b>32.106</b>	<b>439.278</b>	<b>53.524.246</b>	<b>2.504.234</b>	<b>25.478.148</b>

Reference – Kalaycı tax office (2019)

Considering the data presented in Table 38, it becomes clear that there is a suitable potential in terms of biogas energy in the Center, Lüleburgaz and Babaeski districts. On the other hand, it is accepted that not all of these wastes can be collected, some of them will be inaccessible in the pastures or in the process, and the values obtained within this scope are expected to decrease by 1/3. Since these values only include animal wastes, it is predicted that the real potential will be much higher due to the presence of agricultural and industrial organic wastes.

**Table 39 - Biogas-based electricity installed powers calculated according to 2018 data in the districts of Kırklareli province**

District	Bovine Installed Power (MWe)	Ovine Installed Power (MWe)	Poultry Installed Power (MWe)
Center	4,5	2,7	0,4
Lüleburgaz	5,0	1,5	0,2
Babaeski	3,0	0,9	0,1
Vize	1,4	0,7	0,0
Pınarhisar	0,8	0,9	0,0
Demirköy	0,6	0,3	0,0
Pehlivanköy	0,3	0,1	0,0
Kofçaz	0,4	0,6	0,0
<b>Total</b>	<b>16</b>	<b>8</b>	<b>1</b>

Reference – Kalaycı tax office (2019)

In different studies, it has been concluded that the establishment of a biogas power plant will be appropriate for the regions that fall behind Kırklareli province in terms of animal waste, especially from the bovine source, and therefore the biogas potential.



From the data presented in Table 8, it is seen that there is a serious biogas potential that needs to be considered in Center, Lüleburgaz and Babaeski districts. Currently, two biogas plants with an installed power of 4.8 MWe in Lüleburgaz district and 4.3 MWe in Babaeski district of Kırklareli province are in operation. These facilities, named Agman Ovacık Biogas Power Plant and Kumrular Biogas Power Plant, respectively, operate with only 10% efficiency according to the 2019 Renewable Energy Resources (RER) List. Considering the organic waste potential in the region, it leaps out that there is still an important gap. Considering also the development of the region, this reveals that it is attractive to establish a new biogas power plant in the districts of Center and Lüleburgaz, especially Babaeski.

Animal feces become a serious environmental pollutant due to their organic matter content up to 90% and high amounts of COD ( $> 50,000 \text{ mg O}_2 / \text{L}$ ), which makes the fast and useful disposal of these wastes important and necessary. Animal wastes thrown into the environment in an uncontrolled manner pose a risk to society and animal health due to the pathogens they contain, and cause eutrophication by polluting underground and surface waters with the nitrogen compounds (nitrate, ammonia, urea, etc.) it contains. In eutrophic waters, in addition to the odor, algae and microscopic organisms collected on the water surface prevent the sun's rays, preventing oxygen absorption, which is vital for underwater life, and the reduction, or even death, of the aquatic ecosystem, in the long term. On the other hand, the fermented product resulting from biogas generation is an extremely useful and stable product compared to unprocessed feces. With the transformation of fatty acids into different structures as a result of fermentation, it is possible to obtain an almost odorless product in a form that the plants can absorb better. In addition, the rotting process makes the fermented product more hygienic by destroying at least 95% of pathogenic bacteria and many harmful microorganisms such as weed seeds.

Biogas generation is a technology that stands out with its many benefits, especially in the field of renewable energy (Kalaycı, Türker, & Çağlarer, 2019). This process, which has many added value in terms of producing both energy and many valuable by-products, especially by eliminating biomass under the waste class, has started to increase its impact in the sector in recent years. Biogas power plants eliminate many different organic wastes, especially animal wastes, they help to protect the environment and public health by removing pathogens, to prevent environmental problems caused by nitrogen compounds by converting nitrates and other nitrogenous compounds into suitable forms, and to support sustainable agriculture due to the fertilizer feature of the fermented product.



## **4 ANALYSIS OF RISKS AND THREATS**

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### **4.1 Analysis of Risks and Threats**

#### **4.1.1 Effects on Social Life**

Environment is a very important and protected area as it is a living space where human beings live and breathe. The natural environment that man is in is necessary for a person to lead a healthy and peaceful life. For this reason, the environment should not be polluted for the sake of personal or social interests. With the industrialization and urbanization that started afterwards, intense population increases started in the cities. The increasing population has caused environmental problems to arise along with many social, economic, political and psychological problems.

Natural resources such as air, water and soil, which provide the continuity of life on Earth, are polluted or depleted. The population is growing rapidly, and farmland needed for food supply, forests that are insurance for ecological equilibrium and main biological systems are rapidly disappearing. Toxic gases and waste that threaten future generations are increasing all over the world. The causes of climate change have brought the ozone layer to a level that will pierce and flood many pieces of land. First of all, it is possible to say that all these problems are not only a technical problem, but also a dimension of larger social problems.

Even if we do not consider the population growth trends that are likely to occur in the future, it is not possible to fully measure the effects on nature and environment of the seven billion people currently living in our world. When we compare the world where a lower population lived in the past and today's world, we see that ecological equilibrium and events have changed considerably. It is useful to consider the effects of young populations of developing and undeveloped countries in the coming period. The most important of these effects are economic growth, migration to new areas and the need for new settlements and infrastructure in order to survive. It is useful to take into account the consequences of all these effects on social and economic balance. In addition to this situation, the aging population will have to face health problems due to environmental changes.

Another important problem experienced by the world and our country with excessive and unbalanced population growth is the lack of natural resources. Even though the scarcity of natural resources has been a topic of discussion many times in the past, there was basically a belief that natural resources would overcompensate human needs. As studies and research in recent years have shown, while the consumption and pollution of resources is accelerating, the lack of consideration of the eco-system will create very serious problems in the future. Experts say there are three possible ways to ensure adequate food supply for the current world population. These are to bring new agricultural areas to production, to increase production amounts on existing land, to improve and develop existing consumption amounts. When the current situation is examined, it is a fact that fertile lands and soils are eroded and exposed to soil contamination, let alone the expansion of land areas.

It is predicted that food security will find much more space on the agenda in the coming years. While the cumulative food consumption has increased in the world in the past years, developed countries meet a significant part of this consumption increase. This injustice in access to food is in danger of



causing social events on a large scale. Unfair access to food, loss of agricultural land due to wastes, wrong pesticide use, erosion will become major problems, especially for third world countries and developing countries. In order for societies to leave safe, fair and adequate resources for future generations, necessary measures must be taken today.

Climatic and environmental factors are an important determinant of human behavior and adaptation, and humans affect climate and climate affects human beings greatly. Climate events increase the existing social inequalities and cause major social problems around the world. These social problems include climate (environmental) refugees displaced by climate change and staying in tents, rising poverty and displaced people. Furthermore, climate change-related soil degradation prevents access to safe water and food and causes air and water-related diseases. This results in an increase in disease and mortality rates, malnutrition, stress and mental illnesses. Especially in the aftermath of the disaster, the poor, women, the elderly, children are more affected, and the resulting effects are often not possible to eliminate. The negative social consequences of climate change and environmental problems appear to be largely related to environmental injustice and inequality in accessing natural resources.

Water is one of the most important natural resources at the point of continuation of the human generation. Although there are no problems in terms of quantity, there are serious problems with balanced distribution. Most of the available water is found in the oceans. While a significant portion of the remaining water is found in glaciers, a small portion of it is found in nature in the form of underground and above-ground resources. While seawater is not suitable for consumption, water in glaciers flows into the oceans due to global warming. While groundwater is suitable for direct use, only 25% can be accessed due to technical facilities.

The effects of the quality of life standards in social life can be forgotten. In geography and countries where access to resources can be easily provided, access to the above-ground and underground resources needed by urban and rural populations have become quite easy with the technological facilities they have. In addition to this, the destruction of the natural resources of undeveloped countries and environmental disasters cause many social inequalities. Social problems trigger an increase in crime and lead to violence. Pollution and uncontrolled use of natural resources, which are scarce especially in Africa and Southeast Asia, make human life in these regions impossible.

One of the most important features of today's societies is the perception that natural resources are endless. Basically, the formation of such a logic is that the consumption culture of the industrial society has moved away from the benefit-cost idea. The natural resources required to meet our consumption habits are being polluted, destroyed and destructed day by day. There is a danger that consumption and resource use habits will continue in the same trend in the coming period, creating a tension-increasing effect on the use of resources among countries.

Considering the social impacts of climate change and environmental disasters, this creates severe consequences on people who have to live in a polluted environment because of their inability to leave, people who had to migrate from their places as a result of the destruction of forests and fertile lands, and poor people living in heavy industrial areas and exposed to industrial pollution. Social inequality and environmental problems are like two sides of a coin. Inequality created by environmental problems and power imbalance on one side and social inequality and imbalance on the other side have effects on the environment.



While environmental justice is defined as the right to live in a healthy environment, environmental injustice is considered as the unequal distribution of resources that ensure people's well-being. One of the reasons people leave their living quarters is the lack of natural resources. In summary, people living in the developed regions of the world and who are economically strong provide easy access to natural resources, while those living in other regions have difficulties in accessing natural resources (water, cultivated fertile land, etc.) and the poor population of the world pays a heavy price due to the environmental pollution. Environmental refugees are the leading ones who pay the price. Different definitions such as "environment refugees", "climate refugees", "environmental refugee", "environmental migrants" are made for people who are displaced due to ecological reasons.

Environmental refugees carry the risk of becoming an international problem as well as a national problem in the upcoming period. Rural population and people living in neighboring countries may be separated from their places due to reasons such as pollution, water scarcity, food shortage, health problems. It is a phenomenon that has been seen many times in history that these people, whose opportunity to continue their lives in their living spaces has been taken from them, turn to cities and geographies where they can provide access to economic and natural resources. The emergence of such a situation will provide the existence of important social problems for cities and geographies that will be the destination of migration.

In reality, it is not easy to distinguish between refugees who have had to move due to environmental problems and those on whom economic problems are decisive. Because poverty and environmental problems affect each other. This should be considered from two aspects. First of all, it is seen that people in developing regions of the world have low levels of education and income, so there is a lack in their environmental awareness. For this reason, it is obvious that there is a need for improvement in practices aimed at protecting the environment they own and live in. Secondly, developed countries are advantageously located in a geographical location where drought and lack of water is less, forest cover is seen a lot and rainfall is abundant, so they are far from being the subject of environmental problems based on natural causes. In addition, since their education and welfare levels are higher than other developing regions and countries, they are more successful in protecting the environment they live in and preventing human-made disasters. Considering that approximately 150 million people are expected to become environmental migrants in 2050, the seriousness of the social problems to be created by environmental problems becomes clearer (Demirbilek, 2016).

Studies have shown that climate change-related displacements have an impact on migrants' well-being. The process causes long-term stress and psycho-social effects. Being deracinated leads to loss of culture and identity. Immigrants become without land, homeless, unemployed, and have limited use of public services (entry to areas) in their new location. The weakening of their social ties narrows their social networks. Among the environmental refugees who migrate due to climate change and environmental reasons, vulnerable groups such as the poor, women, the elderly, etc. experience more brittleness and more harm.

Cities, together with their dense population, are settlements where administrative, commercial, industrial, cultural and social activities are carried out and which affect the space depending on these activities. With these activities, cities have faced the domestic solid waste problem. Domestic solid wastes have emerged as a natural process in cities and their amount has increased as a necessity of life. This has begun to annoy people in urban life in Turkey. What to do and how to use urban wastes is



also an important problem today. With the increase in the amount of wastes in question, the collection, transportation and healthy storage, disposal and recovery of these wastes have become the important problems of local governments.

#### **4.1.2 Effects on Commercial Life**

Today, as a result of the globalization of the world economy and the rapid increase in environmental problems, while the importance of the relationship between environment and trade increases, environmentally sensitive policies have started to be effective on international trade and international regulations on environment have been gradually integrated into international commercial regulations and agreements. The basic starting point of trade and environmental issues is to protect the environment and ensure sustainable development on the one hand, and, on the other hand, to prevent the use of environmental regulations in international trade in a way that causes a hidden protectionism.

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Trade and environment debates are one of the confrontations mostly occur between developed countries and developing countries. In this context, the effects of environmental commercial measures on market entry and the existence of resource problems for environmentally compatible technologies are of great importance for developing countries. For this reason, developing countries are pressuring that trade barriers to the protection of the environment do not restrict access to markets and do not have any consequences for commercial protectionism.

Various environmental regulations (pollution standards, environmental taxes and fees, subsidies, eco-labeling, etc.) developed to protect the environment as instruments of environmental policy also bring economic impacts. However, this effect is not felt at the same level in all sectors of the economy. Because the environmental pollution created by the sectors in the economy varies according to the types of goods and services they produce. This difference may even occur at the level of companies operating in the same sector. Theoretically, the impact of environmental regulations on competitiveness and trade results from these regulations changing production costs. Because, companies have to bear some control costs in order to prevent the environmental pollution they create in accordance with these regulations. Hence, firms' production costs increase.

The negative impact of environmental regulations on competitiveness is felt more in certain pollution-intensive sectors and sectors where natural resources are operated than in other sectors. The leading sectors such as chemistry, mining, petroleum refinery, cellulose and paper, petro-chemistry, asbestos, copper and iron-steel, cement are among these sectors.

Today, the approach of using trade policies for environmental purposes and the use of the environment for commercial purposes has gained strength. International institutions and rules regarding





development and trade are rapidly entering the environmental framework. Environmental problems, which have been among international issues in recent years, affect economic, industrial and commercial structures and are also affected by these structures. Thus, the occurrences and developments in the world economy and trade and the associated institutional structure should be taken into account. Because the dimension the thinking and activities on the environment have reached eliminates the possibility of dealing with development and trade issues, especially at the strategy level.

Theoretical and technical issues that will bring the development and trade and environment relationship into a new structure are rapidly being resolved and they are increasingly finding application areas. Environmental rules and developments, in other words, international regulations on the environment, market-based orientation efforts, standards have been the leading parts of international trade on the one hand and negotiations, discussions and agreements on international trade on the other hand in a very short time. Moreover, it is clearly understood that these trends will become stronger in the coming years. While the environment emerges as a global issue in the world economy, it also concerns countries individually. In particular, it creates results that are closely related to our economy, which has a high export potential and strives for exports, and the metallurgy sector, which has an important export potential in the country's economy.

The sensitivity of consumer groups and non-governmental organizations in developed countries on ecological issues and the resulting environmental awareness have led consumers to prefer "environmentally friendly" products. Environmental sensitivity in consumer preferences has been reflected in the production techniques of companies and thus companies have turned to produce environmentally friendly products in order to increase both their competitiveness and market shares. This has brought new national and international opportunities for companies. When considered from a commercial point of view, environmental regulations are mandatory regulations for companies. Because, companies that implement these regulations can more easily overcome commercial barriers applied for environmental purposes in international trade. Thus, they can increase their market shares by gaining a significant competitive power against competitors that have focused on the same markets and do not implement the said regulations. In this context, when we look at the issue from Turkey's perspective, the compliance of Turkish companies making production for export with these standards becomes important in terms of international trade.

It is seen that environmental protection movements and standards, which were not considered important previously in the business dimension, are more prominent as a result of bureaucratic pressures and changes in consumer behavior. Green management, which emerged in this context, is an understanding adopted by businesses that consider the ecological environment as an important element in decision-making processes, aim to minimize or completely eliminate the damage to the environment in its activities and within this framework, change the design, packaging and production processes of the products, strive to place the philosophy of the protection of ecological environment into their business culture and fulfill their duties towards society within the scope of social responsibility.



There are concerns that the liberalization of international trade could have positive and negative effects on the environment. The positive effects refer to the fact that commercial liberalization will reduce environmental problems by creating a competitive drive for cleaner production methods. However, the negative impacts are based on the possibility that, due to different environmental policy practices between countries, polluting industries will move to countries with weaker environmental policies, rather than switch to cleaner production. Since developed countries have relatively stricter environmental policies, there is concern that polluter production will focus on developing countries and create a pollution shelter zone, and this possibility will result in the failure of developing countries to reduce or even increase environmental problems on a global scale.

## **4.2 Precaution Analysis**

Environmental pollution is defined as the intense mixing of foreign substances with air, water and soil that adversely affect the living and non-living elements of the environment, cause structural damage and spoil their qualities. It is the unnatural degradation of the environment by human hand. The most important causes of environmental pollution can be listed as rapid population growth, unplanned urbanization, unplanned industrialization, excessive use of natural resources.

Environmental pollution types are generally classified as air pollution, water pollution, soil pollution, noise pollution and visual pollution. Environmental pollution causes damage to all living things in nature, directly or indirectly, by damaging the nature. Today, visual pollution and light pollution are also encountered as environmental pollution, and these environmental pollution are created by humans and cause damage to people and other living things. Pollution of the environment causes climatic changes by disrupting the balance of the ecosystem.

Soil pollution can be caused by air and water pollutants. For example, rain droplets passing through an atmosphere with a high sulfur dioxide content come to the soil in the form of "acid rain". These acidic waters that enter the soil damage tree roots, plant and animal soil creatures. By affecting the reaction of the soil, it disrupts the nutrient balance and makes the ground waters undrinkable. Likewise, water leaking from garbage piles to the soil, dirty irrigation water, fertilizer solutions, radioactive materials, fly ash, heavy metals, industrial waste are the substances and resources that pollute the soil.

Things to do to prevent soil pollution;

- In order to minimize soil loss through erosion, everyone, especially those dealing with soil, should know the value of the soil and use it properly.
- Priority should be given to activities such as using proper agricultural techniques, protecting forest areas, afforestation mobilization.
- The misuse of agricultural lands should be stopped. Because, as a result of the misuse of agricultural lands, the pollutants from industrial facilities and settlements established in these regions pose a significant pollution risk, especially for the agricultural lands in the vicinity.
- Farmers dealing with agriculture and animal husbandry should be trained on fertilization and disinfection.



- Chemical solid and liquid wastes should not be thrown to the soil in industrial zones, mining wastes should not be left on the soil, radioactive wastes should not be given to the soil.

Air Pollution is the presence of solid, liquid and gaseous foreign materials in the atmosphere in the amount, density and time that will harm human health, living life and ecological balance. The air layer is polluted with the wastes generated during the production and consumption activities resulting from the various activities of people, negatively affecting the life on earth.

Acid rain occurs as a result of mixing harmful gases (especially sulfur compounds) with wet or semi-wet materials such as rain, clouds, and snow. Acid rain destroys green areas such as forest areas on the one hand and pollutes the water on the other hand. The earth is warmed by the sun rays reflected from the earth rather than the sun rays falling on it. These reflected rays are captured by gases in the atmosphere, primarily carbon dioxide, methane and water vapor, so the earth gets warmer. The absorption of rays by these gases is called the greenhouse effect.

Air pollution caused by the heating in our cities increases especially with the onset of winter. The main reasons of air pollution caused by heating in the winter months can be listed as the use of poor quality fuels (sulfur, ash and low calorific value coal with high humidity) for heating, the application of wrong combustion techniques and the lack of regular maintenance of the boilers used. In addition to these, rapid population growth and population density in cities, improper settlement of cities according to topographic and meteorological conditions and therefore unplanned urbanization increase the air pollution experienced in our cities.

Chemical gases, dust and fumes from the chimneys of the factories pollute the air. Fuels burned for energy needs in factories and pollutants from the process performed in the factory are released into the air with a chimney and cause pollution. The important thing here is to both maintain development and protect the environment. Workplaces and factories should take the necessary precautions to avoid polluting the environment.

Some of the measures that can be taken against air pollution are as follows:

- As in solving all problems, priority should be given to training, environmental training courses should be provided and the public should be made aware of this issue in various ways.
- Fossil fuels should be used as little as possible. Instead, the use of natural gas, solar energy, geothermal energy, etc. should be expanded.
- Care should be taken to insulate windows, doors and roofs.
- Central heating systems should be used in new settlements.
- Industrial facilities should be built in places far from residential areas, industrial organizations should be prevented from releasing their waste into the air.
- Instead of road transport, emphasis should be placed on rail and sea transport.
- Exhaust emission measurements of vehicles should be made regularly.



- Substances that damage the ozone layer should not be used.
- Green areas should be increased, forest fires should be prevented.

Water pollution is the mixing of unwanted harmful substances with water in a quantifiable amount and density. Houses, industrial establishments, thermal power plants, fertilizers, pesticides, industrial waste water are the main sources of water pollution. All of these directly or indirectly damage living and non-living things.

With the awareness of how water is an important resource for the continuation of life, we have a great duty to leave healthy drinking water and a livable environment to the next generations. At this point, some of the measures that can be taken to prevent water pollution can be listed as follows:

- Industrial and domestic wastes should not be released into water without treatment.
- The use of permanent insoluble detergents should be avoided.
- Cities should be built away from water resources. Sewerage should be installed in every residential unit.
- Measures should be taken to prevent sewage wastes from mixing with drinking water.
- Fertilizers and pesticides used in agriculture should be prevented from mixing with water. Measures should be taken to prevent erosion and forests should be protected.

Materials that have expired and need to be removed from the environment we live in are defined as waste. The residual material that is left behind after materials such as paper, cardboard, glass, plastic are separated from the waste and cannot be used in any way is called garbage.

The wastes coming from residences and/or workplaces that do not contain hazardous harmful substances are called "domestic wastes". Examples of domestic waste are food waste, juice cartons and bottles, plastic water and beverage bottles, glass jars, tins and metal cans.

Prevention at the source is the most important precaution in waste management. Preventing wastes before they occur or reducing them where they occur is the first and priority step of the fight against wastes. If it is not possible to prevent or reduce the wastes or if it cannot be achieved in sufficient quantities, the ways of reuse of the materials considered as waste should be sought. Many wastes are actually items that do not complete their economic and physical life. The next step is recycling. The materials that make up the wastes can be recycled by going through certain procedures. Recycling minimizes the need for new resources to meet consumption by allowing the raw material of many materials to be reused. Another waste management or precautionary method is energy recovery. The substances that make up waste have a potential amount of energy. It is possible to recover this energy contained in materials by certain methods. Finally, disposal follows. Waste that cannot be recovered or recycled must be disposed of. The most important issue regarding disposal is that the disposal process is carried out without harming the environment. During the disposal process, it is important to design the chain from the point where the waste is generated to the point where it will be disposed in an environmentally friendly way.



The steps to be taken for the recovery of wastes are as follows:

- Materials such as glass, metal, plastic and paper-cardboard should be collected separately at the source (at home, school, workplace, etc.) without being mixed with garbage.
- These materials kept separately should be collected by the relevant institutions and organizations without mixing them.
- These materials collected separately at the source should be classified according to their properties (glass, metal, plastic, paper/cardboard) in recycling facilities.
- These materials are used in production facilities as raw materials and/or secondary/tertiary materials to make a new product.
- These products are brought back to the economy and new products are offered for use again.

Costs incurred during operations such as storing, collecting, and transporting wastes can adversely affect the national economies. Therefore, recycling is used to minimize these costs. Although recycling is a very comprehensive issue, it is a point that needs to be focused on in every part of the society. With the recycling of products such as paper, plastic and batteries, the negative effects of waste on the environment are reduced and it contributes to the economy through reuse. About waste generated with increasing consumption, the following should be done:

- Raise awareness of consumers about what to pay attention to before, during and after purchasing products
- Identify the needs of consumers to save money, time and energy, and encourage them to purchase products in a planned way
- Draw attention to the fact that, while purchasing products, attention should be paid to the label and product content, and draw attention to the importance of choosing recycled products and packaging in terms of sustainable consumption and environmental protection
- Encourage consumers to buy products carrying recycling mark
- Encourage people, institutions and organizations with environmental responsibilities, to be environmentally friendly in all their activities
- Contribute to the work to be done to reduce the damage of wastes to the environment, health and economy
- Prepare informative training programs for consumers on waste and implement practices that improve their behavior towards recyclable products
- Take an active role in the communication between the municipalities and authorized public institutions and organizations that undertake the collection, transportation and disposal processes of wastes and the public



- Assist municipalities, authorized public institutions and organizations, as well as private institutions, to develop projects on solid wastes, packaging wastes, hazardous wastes
- Organize events in schools, universities and in all areas where consumption is made together with non-governmental organizations working on this subject in order to draw attention to the recycling of waste, which is one of the main causes of global climate change
- Present an understanding that increases environmental awareness and spreads the environmental product strategy to all businesses.

Considering that the amount of consumption increases day by day and every minute, waste equal to this is generated and all these create environmental, economic, health and global problems; it is clear that they should become aware of the necessity that recycling should be at an important point as much as the basic needs of our lives, large organizations, companies, public institutions and organizations have a great deal of responsibility in this regard, and in micro terms, what kind of consequences will be caused by the products consumed by the consumers, what will be the harmful effects and what they can do to minimize these.

## 5 RESEARCH AND OBSERVATIONAL STUDY

### 5.1 Scope of the Research Study

Within the scope of the research study, a research was conducted among 511 people living in 50 villages within the borders of Kırklareli province. Schools in the region were included in the scope of the research. The results of the research will form a basis for adapting the practices such as project awareness raising activities, workshops etc. to the specific characteristics and knowledge of the Kırklareli population. Agendas, lessons and cases will be developed for informative activities based on the information obtained, and the project is expected to provide a basis for the preparation of information texts in promotional materials.

### 5.2 Method of the Research Study

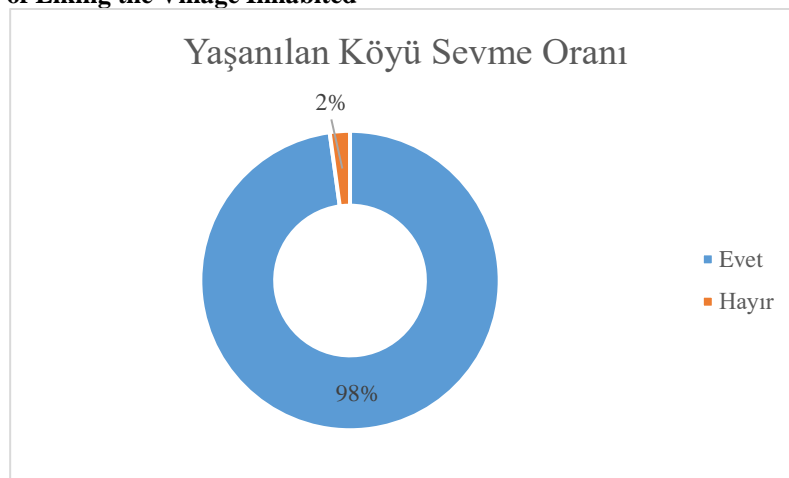
The method of the research is to meet people face-to-face with life contact and friendly chat in order to get feedback. The 511 people interviewed were planned and implemented to be 10 people from each village. The survey prepared within the scope of the research consists of 12 questions. Mixed survey form applied in survey of multiple-choice questions and open-ended questions.

### 5.3 Analysis of the Research Data

The analysis of the research data was carried out in the form of the answers given to the questions by the individuals participating in the survey and the method of explaining these answers.

#### Question 1: Do you like the village you live in?

Figure 15 – Rate of Liking the Village Inhabited



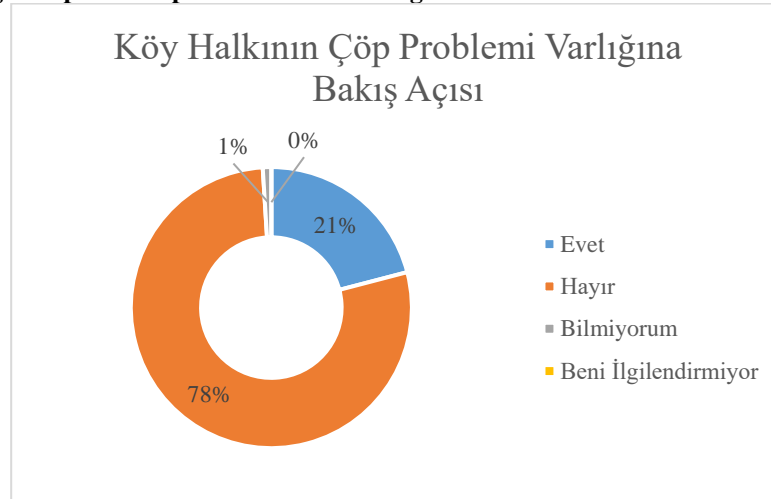
Participants answered yes with a rate of 98% to the first question of the survey. This can be interpreted as an indication that the individuals participating in the survey are highly sensitive to the survey subject. As the subject of the survey is the garbage in the village and its surroundings, it is important



for the individuals participating in the survey to love the place they live in, in terms of sensitivity to a possible garbage problem in the region. In addition to this, the love of the people participating in the survey for the place where they live increases the expectations that they will participate in a possible garbage disposal project.

### Question 2: Do you think there is a garbage problem in your village?

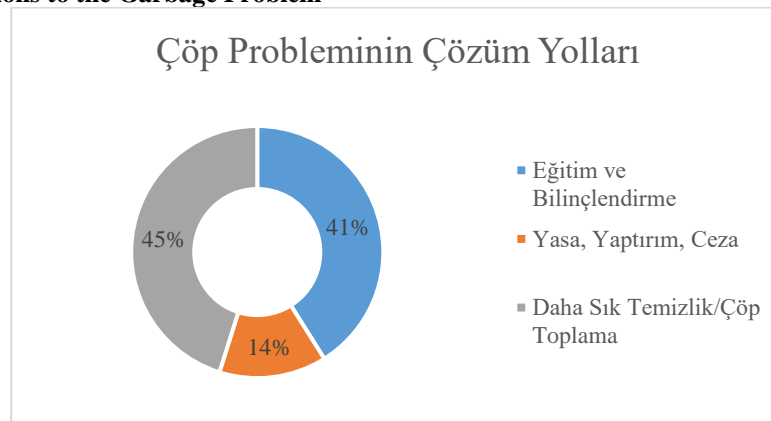
Figure 16 - Village People's Perspective on the Garbage Problem



78% of the participants answered no to the second question of the survey. The majority of the participants think that there is no garbage problem in their place of residence. In addition to this, 21% of the participants who answered no to the question, declared that they did not see waste or garbage in their village by marking the option "other" to another question of the survey, "What is the most common type of garbage or waste in your village?". This may indicate that the participants did not perceive their seeing garbage in their village as a garbage problem. 65% of the participants who answered no to the question stated that they saw garbage in their villages by marking the types of garbage in the other survey question mentioned above.

### Question 3: If there is a garbage problem in your village, what do you think is the solution to this problem?

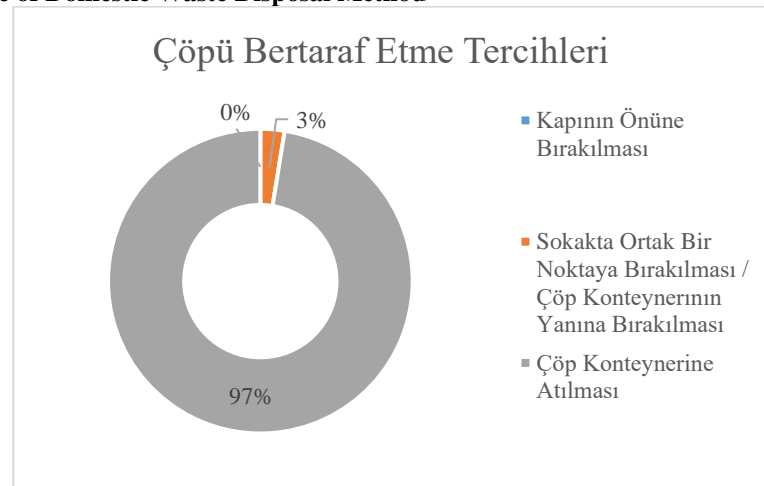
Figure 17 - Solutions to the Garbage Problem



Participants answered the question as "Education and awareness raising" at a rate of 45%, "More frequent garbage collection / cleaning" at 41%, and finally "Law, sanction, penalty" at 14%. 47% of the participants who declared that there is no garbage problem in their village did not answer this question. In the previous question, 24% of those who declared that there is no garbage problem in their villages preferred "collecting garbage more frequently", 21% "education and awareness" and 6% "legal practices" for the solution of the garbage problem. In general, regardless of the perception that there is a garbage problem in their village, they preferred preventive methods in solving the garbage problem. This indicates that it is a common statement that the solution of the waste and waste problem depends on the increase in training and the quality of garbage/cleaning service.

#### Question 4: How do you dispose of household garbage?

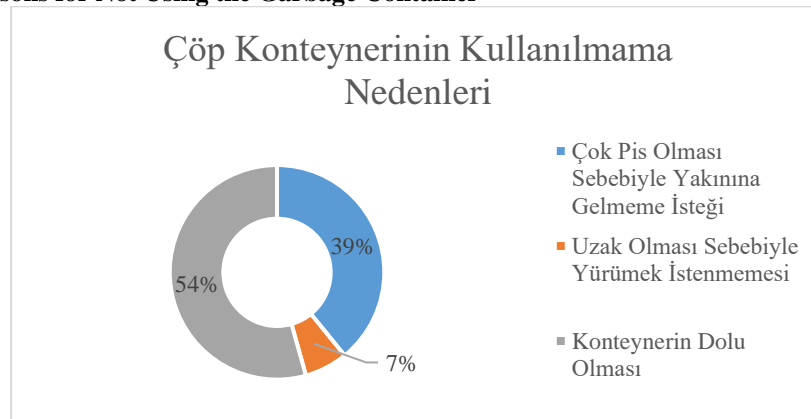
Figure 18 - Choice of Domestic Waste Disposal Method



97% of the participants answered the question as "I'm throwing it in the garbage container". 3% of the participants chose the answer to the question "I leave it at a point where everybody leaves garbage on the street or next to a garbage container". This strongly indicates that the villagers participating in the survey prefer to dispose of their garbage through containers. The number, quality and structure of garbage containers seem to be an important factor in increasing the service quality.

#### Question 5: If you are not using the garbage container, why?

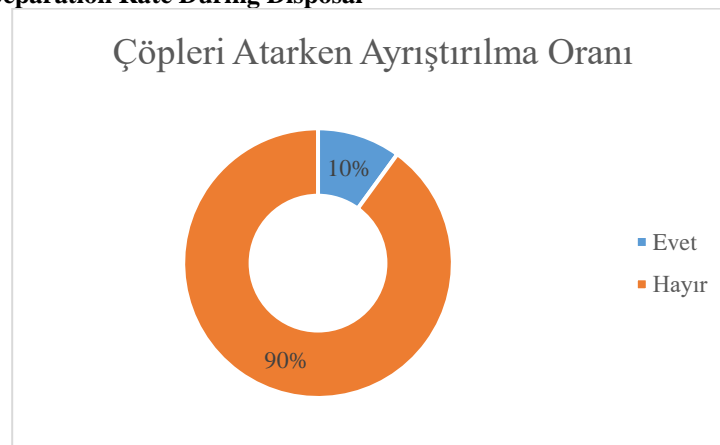
Figure 19 - Reasons for Not Using the Garbage Container



90% of the participants did not answer the question. It is natural that the question arising from the use of containers at 97% in the previous question was not answered at a high rate. 54% of those who answered the question chose the option "The fact that the container is full", while 39% chose the option "Not wanting to come near it because it was very dirty". Finally, 7% chose the option "Not wanting to walk because it is far away". While 51% of those who answered this question saying that they used containers, they chose to mark the fullness of the containers, while 43% indicated that they would not come near because the containers were very dirty. Stating that they use containers and marking the aforementioned options in this question appears as a data related to the improvement of containers. In addition to this, 9% of the container users have marked this question.

#### Question 6: I separate the garbage while throwing it

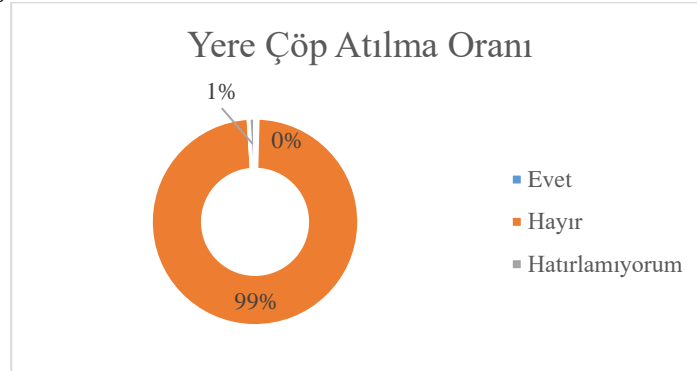
Figure 20 - Waste Separation Rate During Disposal



Participants answered no to the question at a rate of 90% and the rate of yes answers remained at 10%. Considering that the participants generally answered no to the question, it is seen that there is not enough awareness at the point of sorting garbage, which is very important for recycling, in addition to using containers at a high rate, declaring that there is no garbage problem in the village where they live, and emphasizing training in solving the garbage problem. At this point, raising the awareness of the villagers is an important issue. Another issue related to this issue is the structure of garbage containers. Factors such as the fact that the physical structure of the currently used containers allow the waste to be separated while disposing will have an facilitating effect on the separation of waste during disposal.

### Question 7: Do you litter?

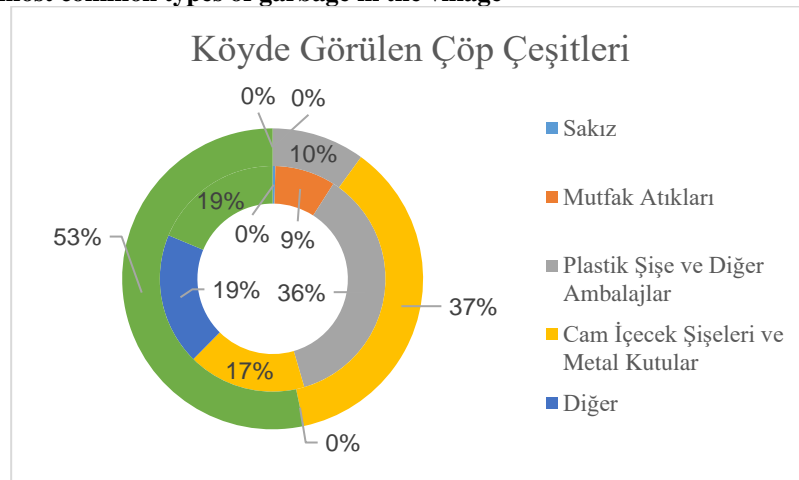
Figure 21 – Littering Rate



99% of the participants answered no to this question. This indicates that the participants show high sensitivity and attention to the survey subject, waste and waste management. It stands out as a positive data on environmental protection.

### Question 8: Which type of garbage or waste you see most often in your village?

Figure 22 - The most common types of garbage in the village



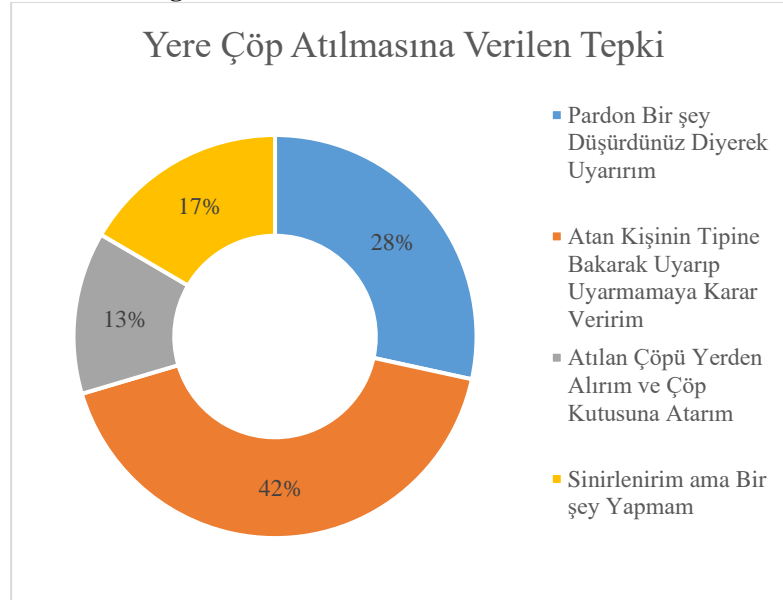
Participants marked the option "Plastic bottles and other packaging" at 36%, "Cigarette butts" at 19%, "Glass beverage bottles and metal cans" at 17%, "Kitchen waste" at 9%, and "other" at 19%. 88% of those who preferred the option "other" declared that there is no garbage or waste in the village where they live. 11% of those participating in the survey preferred two options. As the second option, 53% preferred "Cigarette butts", 37% preferred "Glass beverage bottles and metal cans", 10% preferred "Plastic bottles and other packaging".

The first thing that draws attention with regard to the answers given is that plastic bottles and other packaging are the first choice, while the same option is the last choice as the second choice. Another remarkable issue is that the option "cigarette butt", which is the most marked option as the second choice, is preferred as the "other" option as the first choice. This is primarily because cigarette butts are not seen as an important type of garbage and they have the same level of perception as the participants who said they did not see any garbage or waste in their village. Another issue is that 81%

of the participant population, who mostly stated that there is no garbage problem in their villages, saw any type of garbage in their villages.

### Question 9: What do you do when you see someone littering?

Figure 23 - Response to Littering

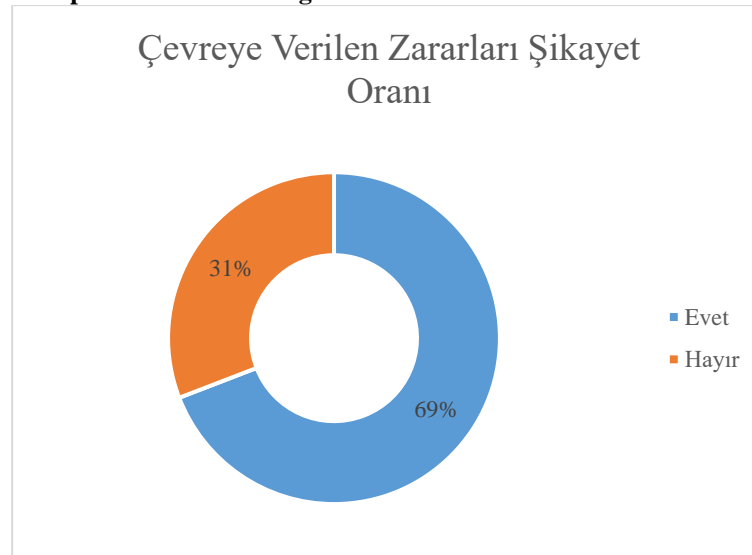


42% of the participants preferred the option "I decide whether to warn by the type of the thrower", while 28% said "I will warn by saying excuse me, you dropped something". 17% said "I get angry but I won't do anything", 13% said "I pick up the waste from the ground and throw it into the garbage bin".

The fact that the most preferred answer given to the question is to react according to the person who throw garbage is seen as an important point regarding the subject. This can be explained by the fact that the area where the survey was conducted is a village with an out-of-town living space. In addition to the participants not choosing not to come across the village people they live with for such a reason, the physical characteristics of the thrower have an effect on whether or not to react. This tends to be parallel to the reasons behind the choice of not doing anything while having a negative feeling towards the act of littering on the ground. With this, the proportion of those who prefer to warn or take the garbage from the ground is close to those who look at the type of person who throws it, indicating a general awareness of the issue. There is a preference of thinking that the action taken is not the right one and to stimulate compensation for the action in question by warning or to compensate by taking the compensatory action themselves.

**Question 10: I make a complaint to the relevant authorities when I witness activities that will cause environmental pollution or damage to natural resources.**

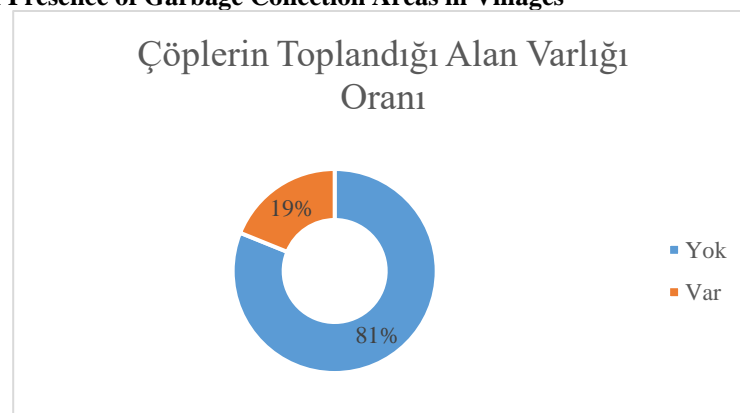
**Figure 24 - Rate of Complaints on the Damages Given to the Environment**



While 69% of the participants answered yes to the question, 31% answered no. This suggests that the participants have different perceptions about domestic waste and activities that cause environmental pollution and destruction. Participants show high sensitivity to the natural habitat of the village they live in. At this point, it is thought that an active cooperation can be made with the local people against activities that cause environmental damage in the region where the survey was conducted. It is believed that conveying the legislation related to said activities and providing a training to the people of the region on which institutions can be contacted may be beneficial. In this way, possible environmental pollution and destruction can be prevented in an organized manner.

**Question 11: Is there an area where garbage collected is dumped in and around your village?**

**Figure 25 - Rate of Presence of Garbage Collection Areas in Villages**



81% of the participants answered the question as “there is not”. The rate of those who said “there is” remained at 19%. Participants who pointed out the option “there is” in the question were asked about their opinions about the effect of the existence of such an area on social and business life. A remarkable



part of the participants who marked the option “there is” found the existence of such a field favorable. In addition to this, there are also those who report discomfort due to the incineration of the collected garbage. One participant also mentioned that the collected garbage remained in the collection area and the waste was not transported. In general, the existence of such an area is considered favorable. Participants consider the preventive effects of environmental pollution by collecting the waste generated in the village in a specific area. The existence of a regular collection area, regardless of whether the collection area meets sufficient standards or not, is preferred to the irregular distribution of waste and garbage.

#### **Question 12: What are the factors affecting air and environmental pollution in the village and its surroundings?**

The last question of the survey is an open-ended question. 10% of the participants answered this question. The answers generally focus on the individuals’ leaving the garbage and wastes to the environment, water pollution caused by the lack of infrastructure in the region, animal wastes, air pollution created by quarries, air pollution caused by burning coal and wood, and destruction points caused by industrial wastes. 90% of the participants did not answer this question.

Unlike the surrounding provinces, the province where the participants live is a region that has not progressed towards industrialization. Economic activities in the region focus on agriculture and service sectors, and a certain part of the existing industry stands out as the food industry. The absence of heavy industrial facilities in the region prevents the rural population from being protected from industrial wastes and from being exposed to air pollution. In addition to this, the surrounding area of the region is surrounded by industrial establishments. In the coming period, the province is likely to become attractive in terms of new industrial facilities due to its location. After such a situation occurs, how the perception of air and environmental quality will take shape is an issue that needs to be followed.

### **5.4 Result of the Research**

When the results of the research are considered in general, it is understood that the villagers participating in the survey do not see any significant problems regarding the environment they live in, and they do not see any dissatisfaction or risk in the disposal and management of domestic and agricultural wastes in and around the villages they live in.

Contrary to the surrounding provinces of the region, the industrial underdevelopment prevents a massive environmental pollution. Methods of disposal of waste and garbage created by agricultural activities in the region are usually carried out with local solutions. It is important to inform the people of the region about potential risks related to the environment they live in. Since the region is an agricultural area, the recovery of agricultural wastes has the potential to be an important investment area. The establishment of the necessary networks and the recovery of the wastes will make a positive contribution to the organized disposal of the wastes generated not only within the provincial borders but also by other metropolitan and industrial cities in the region.

It is important to raise the awareness of the people of the region for the recovery of animal wastes or use of them for other purposes. In the province where the agricultural population has a significant share, the recovery of agricultural and domestic wastes will create a significant economic gain. There is the potential to actively cooperate with the local community regarding illegal dumping.





## 6 EFFECT ANALYSIS

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### 6.1 Effect Analysis of the Research

Unmanageable solid wastes in Turkey create environmental problems, and solid waste management is one of the important problems in cities. Solid waste management varies according to the characteristics of the countries. Solid waste management in Turkey is carried out by municipalities within the scope of local governments. Most of the cities experience various problems in solid waste management, and these problems are the ineffectiveness of existing regulations in solid waste management, lack of information about planning and financial limitations.

Solid wastes cause air, water and soil pollution when they are not disposed of properly in terms of technic and health. In this direction, methods that will least harm the environment should be used in the disposal of solid wastes. Solid waste is increasing day by day with population growth, technological development, industry and urbanization. The increase in the amount of solid waste causes environmental pollution and unconscious consumption of raw materials. Accordingly, the recycling of waste is important in preventing environmental pollution and conscious use of resources. Recycling of waste positively affects the environment and economy.

The Waste Management Plan aims to combine waste collection, treatment and disposal methods with a holistic approach to achieve environmental benefit, economic optimization and social acceptability goals. The plan plays an important role in solving waste management problems, protecting the environment and preventing environmental pollution caused by bulky waste.

Waste management principles are generally divided into three. These are the principles of prevention, precaution, proximity and self-sufficiency. Detailed information on these principles is given below.

- **Prevention Principle:** To ensure that waste generation is minimized in order to protect nature and natural resources.
- **Precautionary Principle:** To ensure that the effects of waste on human health and the environment are reduced. In addition, to ensure that the hazardous substances in wastes are reduced.
- **Proximity and Self-Sufficiency Principle:** To validate the principle of "Polluter pays" for citizens who generate waste. To provide appropriate infrastructure by establishing integrated and appropriate disposal facilities.

Waste management is a complex process that starts with the prevention of wastes where they occur and continues until their disposal. At this point, informing and training the households, parties in commercial and public areas where waste is generated gain importance. Environmental pollution caused by waste and garbage can be prevented by taking the necessary actions and raising awareness at the place where waste is generated. With the awareness of the parties, both waste of resources can be prevented and wastes that have economic value can be brought back to the economy.



## 7 CONCLUSION AND RECOMMENDATIONS

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All of the substances that develop as a result of production and use activities and that are harmful to be released to the environment directly or indirectly in a way that will harm human health and the environment are called waste. Waste management, on the other hand, includes processes such as reduction of waste at its source, its separation according to its characteristics, transportation, collection, temporary storage, interim storage, recovery, disposal and control after the disposal processes. There are various stages for effective waste management.<sup>3</sup>

- The first of these stages is to determine the authorized or responsible person. At this stage, a responsible person should be determined for the smooth running of waste processes. In addition, an Environmental Unit consisting of sufficient number of personnel should be established by the designated responsible.
- The second stage in waste management is the definition of waste. At this stage, all wastes generated in the facility are identified and their sources are determined. First of all, domestic solid wastes, packaging wastes and industrial wastes taken by the municipality are determined. In addition, the frequency and amount of waste is determined. Issues such as the legislation to which wastes are subject, the way they are collected and transported, and the maximum storage period are also determined at this stage.

The third stage is collecting the waste separately at its source. In order to collect the wastes separately at the source, containers of sufficient size and number suitable for the type and quality of the wastes are placed in the places where the wastes are generated.

- The fourth stage in effective waste management is staff training. Training on waste management is provided to all personnel, especially the team responsible for waste management.
- The fifth stage of waste management is the establishment of a temporary waste storage area. At this stage, a temporary waste storage area is established to store the collected wastes within the facility in a safe and regulated manner. Different storage areas can be established for hazardous wastes, packaging wastes and domestic wastes.
- The sixth stage is waste pre-treatment. At this stage, packaging waste, packaging contaminated with hazardous waste are compressed to take up less space during storage and transportation. Aqueous wastes are dehydrated as much as possible. These measures provide significant economic advantages in terms of weight and cost.
- The seventh stage of waste management is the disposal or recovery of waste. Necessary researches and studies are carried out for the disposal or recovery of the wastes in the temporary storage area. The last stage of effective waste management is keeping records. Records of all processes carried out are kept regularly. This situation facilitates the preparation

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<sup>3</sup> Gündüzalp ve Güven; Atık, Çeşitleri, Atık Yönetimi, Geri Dönüşüm ve Tüketici: Çankaya Belediyesi ve Semt Tüketicileri Örneği; 2016.



of waste declaration forms, preparation of Waste Management Plans and possible revisions.

The population and industry of Turkey generate approximately 85 million tons of waste per year. Today, there are more than two thousand licensed businesses in Turkey, including collection, separation and recycling facilities. These businesses employ more than 60 thousand people. Turkey's waste management and recycling sector has a total annual turnover of approximately \$ 5 billion. Waste management in Turkey is divided into two as industrial and domestic waste management. Industrial wastes are mostly collected separately and brought into the economy. However, domestic wastes, especially packaging wastes, cannot be used for recycling. Around 34 million tons of domestic waste is generated annually in Turkey. 7.5 million tons of these wastes are recyclable. These wastes, which have an economic value of approximately 6.5 billion TL, are buried in landfills with other wastes since they are not collected separately. In addition, the state spends 1 billion TL through municipalities to bury waste that cannot be collected separately in landfills. The regulations made in the Zero Waste Project and the Environment Law, which were implemented in 2018, contributed to the development of the recycling sector. In addition, in 2018, with the Regulation on Control of Packaging Waste, recycled raw material usage quota was introduced for packaged products. In addition, practices such as paid shopping bags, etc. are important for recycling. With the increase in waste collection rates, there is a need for a system that will collect, sort according to types and recycle. In this case, the technical and technological infrastructure of the waste management and recycling sector should be strengthened. The infrastructure of recycling facilities for domestic waste in Turkey are not enough. In addition, it has not developed compared to the facilities in European countries. Therefore, facility investments with strong technological infrastructures are very important for the recycling sector. In 2018, the investment incentive system was changed. With the change made, the waste management and recycling sector has become one of the priority investment subjects to be supported. In this context, investments over 5 million TL will benefit from the fifth region incentives, regardless of the region where the investment is made. With the change in the incentive system, it is predicted that investments in the sector will increase.<sup>4</sup>

In recent years, the importance of recycling and waste management in Turkey is increasing. More than half of the waste generated in Turkey is recyclable. In 2018, nearly 100 investment incentive certificates with a fixed investment amount of approximately 1.27 billion TL were issued for investments related to waste disposal, recovery and recycling. More than one third of the investments that received incentive certificates are facilities for metal waste and scrap and plastic recovery. Only four of the issued documents belong to companies with foreign capital. Among these investments, the highest fixed investment amount is for steel powder recovery. Others are investments in waste oil, glass and flue dust recovery. In addition, as of the end of 2018, only 49 of the 65 thousand 533 foreign capital companies operating in Turkey operate in the recycling sector, which includes recycling. 16 of the companies in Turkey are from Germany, which is among the successful recycling countries. The number of foreign companies operating in services such as sewage, garbage and waste collection is 49.<sup>5</sup>

Countries use various methods for waste management. With these methods, it is aimed to protect public health, protect the environment and prevent environmental pollution, and save resources and energy.

<sup>4</sup> Türkiye Değerlendirilebilir Atık Malzemeler Sanayicileri Derneği, Geri Dönüşüm Seferberliği Başladı; 2019.

<sup>5</sup> Türkiye Sınai Kalkınma Bankası, Atıkta Değer Var; 2019.



Public health concern has formed the basis of solid waste management programs in many countries today. Solid wastes that are not collected and disposed of properly can be a breeding ground for insects, pests and vermin and can cause air and water-borne diseases. Studies show that the prevalence of various diseases is increasing in areas where waste is not collected regularly and properly. In line with this, the regular collection, transportation, recovery or disposal of wastes eliminates threats to human health. In addition, not collecting wastes as required or not disposing them properly can cause harmful effects on the environment. In low- and middle-income countries, waste is often dumped in lower-income areas or on land adjacent to slums. This threatens the health of the people of the region and causes environmental pollution. Environmental threats include contamination of groundwater and surface water with leachate water. In addition, air pollution caused by the burning of waste that is not properly collected and disposed of is among environmental threats. Proper collection, disposal or recycling of wastes will eliminate these environmental threats. At the same time, waste represents an important potential resource. In recent years, the recyclable products market has grown globally. It is estimated that the total post-consumer scrap metal in the world is approximately 400 million tons per year and the total paper and cardboard is approximately 175 million tons per year. This represents a global value of at least \$ 30 billion a year. Producing new products with secondary materials provides significant energy savings. In addition, producing new products with secondary materials prevents waste of resources.<sup>6</sup>

Sustainable development emerges as a concept that has social, economic and environmental dimensions, and its importance is rapidly increasing in the world and in Turkey. Rapid population growth and consequently increasing consumption-centered lifestyles lead to an increasing consumption of natural resources.

Waste management, on the other hand, refers to a long process that has an important place in sustainable development and especially with the understanding of integrated waste management, sees waste not as a waste but as a resource, starts with the prevention of waste generation before the generation of waste and cover reducing, reusing, recycling, energy recovery, disposal and monitoring after disposal. For the management and success of this process, it is an important point for success that all parties agree on the subject and act in harmony.

Raising awareness in individuals and companies against waste management in the region will prevent the damage caused by waste to human health and the environment. In addition, resource and energy savings will be achieved through recovery.

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<sup>6</sup> Hoornweg ve Bhada-Tata, What A Waste, A Global Review of Solid Waste Management; 2015.



## 8 ANNEXES

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### **Annex-1:** Survey Forms

## 9 REFERENCES

- ALBA Group. <https://www.alba.info/en/our-company/about-us/>. 2019. <https://www.alba.info/en/our-company/about-us/> (erişildi: 08 20, 2019).
- Andersson, Camilla , ve Jesper Stage . «Direct and Indirect Effects of Waste Management Policies on Household.» 2018.
- Baloharlı, Vahit. «Dünyadaki Atık Yönetimi Uygulamaları.» 2017.
- Chung, Shan-shan , Ka-yan Winifred Lau, ve Chan Zhang. «Measuring Bulky Waste Arisings in Hong Kong.» 2010.
- Chung, Shan-shan, Ka-yan Winifred Lau, ve Chan Zhang. «Measuring Bulky Waste Arisings in Hong Kong.» Waste Management, no. 30 (2010): 737-743.
- Curran, A, ve I D Williams. «The role of furniture and appliance re-use organisations in England and Wales.» 2008.
- Curran, Anthony , Ian Williams, ve Sonia Heaven. «Management of household bulky waste in England.» 2007.
- Dünya Bankası. [http://datatopics.worldbank.org/what-a-waste/trends\\_in\\_solid\\_waste\\_management.html](http://datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html). 2019. (erişildi: 10 25, 2019).
- . [http://datatopics.worldbank.org/what-a-waste/trends\\_in\\_solid\\_waste\\_management.html](http://datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html). 2019. [http://datatopics.worldbank.org/what-a-waste/trends\\_in\\_solid\\_waste\\_management.html](http://datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html) (erişildi: 11 15, 2019).
- Financial Times. «Dünyada Geri Dönüşüm Sistemi Neden Çöktü?» Financial Times, 2018.
- Gallardo, Antonio , Maria Bovea, Francisco Colomer, Miriam Prades, ve Mar Carlos. «Comparison of Different Collection Systems for Sorted Household Waste in Spain.» 2010.
- Gündüzalp, Anıl, ve Seval Güven. «Atık, Çeşitleri, Atık Yönetimi, Geri Dönüşüm ve Tüketici: Çankaya Belediyesi ve Semt Tüketicileri Örneği.» 2016.
- Hoornweg, Daniel, ve Perinaz Bhada-Tata. «What A Waste: A Global Review of Solid Waste Management.» 2015.
- Jung, C, T Matsuto, ve N Tanaka. «Flow Analysis of Metals in A Municipal Solid Waste Management System.» 2006.
- AÇA. (2020). *Avrupa'da Çevre - Durum ve Genel Görünüm 2020*. Kopenhag: Avrupa Çevre Ajansı.
- ALBA Group. (2019). <https://www.alba.info/en/our-company/about-us/>. 08 20, 2019 tarihinde <https://www.alba.info>: <https://www.alba.info/en/our-company/about-us/> adresinden alındı
- Andersson, C., & Stage , J. (2018). Direct and Indirect Effects of Waste Management Policies on Household. 10 24, 2019 tarihinde alındı
- Aydın, A. H., & Çamur, Ö. (2017). Avrupa Birliği Çevre Politikaları ve Çevre Eylem Programları Üzerine Bir İncelem. *Bingöl Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 21- 44.
- Baloharlı, V. (2017). Dünyadaki Atık Yönetimi Uygulamaları. 08 20, 2019 tarihinde alındı
- Baran, G. A. (1993). Toplum, Birey ve Çevre İlişkileri. *Hacettepe Üniversitesi Edebiyat Fakültesi Dergisi*, 261-278.
- Başar, H. (2001). Bursa İli Topraklarının Verimlilik Durumlarının Toprak Analizleri İle İncelenmesi. *Uludağ Üniversitesi Ziraat Fakültesi Dergisi*, 15, 69-83. 08 21, 2019 tarihinde <https://dergipark.org.tr/download/article-file/153940> adresinden alındı
- Baykal, H., & Baykal, T. (2008). Küreselleşen Dünya'da Çevre Sorunları. *Mustafa Kemal Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 1-17.
- Bayraktutan, Y., & İnmez, İ. (2017). Çevre Sorunları, Uluslararası Ticaret ve Kuruluş Yeri Tercihleri.



- Uluslararası Ekonomik Araştırmalar Dergisi*, 305-325.
- Bergeron, F. (2016). Multi-Method Assessment of Household Waste Management in Geneva Regarding Sorting and Recycling. 10 23, 2019 tarihinde alındı
- Budak, S. (2004). *Uluslararası Çevre Düzenlemeleri Bağlamında Politika, Adalet ve Kalkınma*. İstanbul: Beta Yayınları.
- Bursa Büyükşehir Belediyesi. (2014). *2015-2019 Stratejik Plan*. Bursa. 08 21, 2019 tarihinde [https://www.bursa.bel.tr/dosyalar/yayinlar/180521012109\\_2015-2019.pdf](https://www.bursa.bel.tr/dosyalar/yayinlar/180521012109_2015-2019.pdf) adresinden alındı
- Bursa Büyükşehir Belediyesi. (2018). *2019 Yılı Performans Programı*. Bursa. 08 21, 2019 tarihinde [https://www.bursa.bel.tr/dosyalar/yayinlar/190104100544\\_2019-YILI-PERFORMANS-PROGRAMI.pdf](https://www.bursa.bel.tr/dosyalar/yayinlar/190104100544_2019-YILI-PERFORMANS-PROGRAMI.pdf) adresinden alındı
- Bursa Büyükşehir Belediyesi. (2019). *2018 Yılı Faaliyet Raporu*. 12 16, 2019 tarihinde [https://www.bursa.bel.tr/dosyalar/yayinlar/190430085758\\_2018\\_faaliyet\\_RAPORU-web.pdf](https://www.bursa.bel.tr/dosyalar/yayinlar/190430085758_2018_faaliyet_RAPORU-web.pdf) adresinden alındı
- Bursa Büyükşehir Belediyesi. (2019). *2019 Yılı Mali Bütçesi*. Bursa. 08 20, 2019 tarihinde [https://www.bursa.bel.tr/dosyalar/yayinlar/190104104016\\_butce-son.pdf](https://www.bursa.bel.tr/dosyalar/yayinlar/190104104016_butce-son.pdf) adresinden alındı
- Bursa Büyükşehir Belediyesi. (2019). *2020-2024 Stratejik Planı*. 11 14, 2019 tarihinde alındı
- Bursa Büyükşehir Belediyesi. (2019). <https://www.bursa.bel.tr/?sayfa=idari>. 08 19, 2019 tarihinde <https://www.bursa.bel.tr/?sayfa=idari> adresinden alındı
- Bursa Büyükşehir Belediyesi. (2019). <https://www.bursa.bel.tr/?sayfa=idari>. 08 20, 2019 tarihinde <https://www.bursa.bel.tr/?sayfa=idari> adresinden alındı
- Bursa Büyükşehir Belediyesi Çevre Koruma ve Kontrol Dairesi Başkanlığı. (2015). *Bursa Entegre Katı Atık Yönetim Planı*. Bursa. 09 23, 2019 tarihinde [https://www.bursa.bel.tr/dosyalar/atik\\_plan.pdf](https://www.bursa.bel.tr/dosyalar/atik_plan.pdf) adresinden alındı
- Bursa Eskişehir Bilecik Kalkınma Ajansı. (2015). *Bursa Eskişehir Bilecik Kalkınma Ajansı 2014-2023 Bölge Planı*. Bursa. 08 20, 2019 tarihinde [https://www.bebka.org.tr/admin/datas/yayins/92/bolgeplani2014-2023web-2\\_1543236013.pdf](https://www.bebka.org.tr/admin/datas/yayins/92/bolgeplani2014-2023web-2_1543236013.pdf) adresinden alındı
- Bursa Eskişehir Bilecik Kalkınma Ajansı. (2015, 03 06). *Mevcut Durum Analizi*. 05 09, 2019 tarihinde [https://www.bebka.org.tr/admin/datas/yayins/mevcut\\_durum\\_analizi\\_06\\_03\\_2015.pdf](https://www.bebka.org.tr/admin/datas/yayins/mevcut_durum_analizi_06_03_2015.pdf) adresinden alındı
- Bursa Eskişehir Bilecik Kalkınma Ajansı. (2015). *Mevcut Durum Analizi*. 08 21, 2019 tarihinde alındı
- Bursa Eskişehir Bilecik Kalkınma Ajansı. (2016, 02). *Bursa Yatırım Ortamı ve Sektörler*. 05 09, 2019 tarihinde [https://www.bebka.org.tr/admin/datas/yayins/bursayatirimkitabi\\_web.pdf](https://www.bebka.org.tr/admin/datas/yayins/bursayatirimkitabi_web.pdf) adresinden alındı
- Bursa İl Kültür ve Turizm Müdürlüğü. (2018). <http://www.bursakulturturizm.gov.tr/TR-70229/cografya.html>. 05 07, 2019 tarihinde <http://www.bursakulturturizm.gov.tr/TR-70229/cografya.html> adresinden alındı
- Bursa Su ve Kanalizasyon İşleri Genel Müdürlüğü. (2019). <http://www.buski.gov.tr/content/uploads/raporlar/faaliyetraporu/2015/index.html>. 05 09, 2019 tarihinde <http://www.buski.gov.tr/content/uploads/raporlar/faaliyetraporu/2015/index.html> adresinden alındı
- Bursa Valiliği. (2019). *Bursa Ekonomik ve Sosyal Göstergeler*. 08 09, 2019 tarihinde <http://www.bursa.gov.tr/kurumlar/bursa.gov.tr/Bursa.gov/dosyalar/2019->





- ekonomik\_gosterge.pdf adresinden alındı
- BURSAGAZ Bursa Şehir İçi Doğalgaz Dağıtım Ticaret ve Taahhüt A.Ş. (2019). <https://www.bursagaz.com/kurumsal-hakkimizda>. 05 09, 2019 tarihinde <https://www.bursagaz.com>: BURSAGAZ Bursa Şhiriçi Doğalgaz Dağıtım Ticaret ve Taahhüt A.Ş. adresinden alındı
- Chung, S.-s., Lau, K.-y. W., & Zhang, C. (2010). Measuring Bulky Waste Arisings in Hong Kong. *Waste Management*(30), 737-743. 08 19, 2019 tarihinde alındı
- Chung, S.-s., Lau, K.-y. W., & Zhang, C. (2010). Measuring Bulky Waste Arisings in Hong Kong. 10 25, 2019 tarihinde alındı
- Curran, A., & Williams, I. D. (2008). The role of furniture and appliance re-use organisations in England and Wales. 10 24, 2019 tarihinde alındı
- Curran, A., Williams, I., & Heaven, S. (2007). Management of household bulky waste in England. 10 24, 2019 tarihinde alındı
- ÇŞB. (2019). *Avrupa Çevre Ajansı ve Türkiye'de Yapılan Çalışmalar*. Ankara: Çevre Ve Şehircilik Bakanlığı.
- Demirbilek, M. (2016). Çevre, Çevre Mültecileri ve Çevreci Sosyal Hizmet. *International Journal of Social Sciences and Education Research*, 905-914.
- Duru, B. (2007). Avrupa Birliği Çevre Politikası. Ç. Erhan, & D. Senemoğlu içinde, *Avrupa Birliği Politikaları* (s. 280). Ankara: İmaj Yayınları.
- Dünya Bankası. (2019). [http://datatopics.worldbank.org/what-a-waste/trends\\_in\\_solid\\_waste\\_management.html](http://datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html). 10 25, 2019 tarihinde <http://datatopics.worldbank.org>. adresinden alındı
- Dünya Bankası. (2019). [http://datatopics.worldbank.org/what-a-waste/trends\\_in\\_solid\\_waste\\_management.html](http://datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html). 11 15, 2019 tarihinde <http://datatopics.worldbank.org>: [http://datatopics.worldbank.org/what-a-waste/trends\\_in\\_solid\\_waste\\_management.html](http://datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html) adresinden alındı
- Erdoğan, H., & Yönetken, A. (2018). Katı ve Biyolojik Atıkların Elektrik Enerjisi Üretimindeki Yeri. *Afyon Kocatepe Üniversitesi Uluslararası Mühendislik Teknolojileri ve Uygulamalı Bilimler Dergisi*, 24-27.
- Financial Times. (2018). Dünyada Geri Dönüşüm Sistemi Neden Çöktü? *Financial Times*. 09 23, 2019 tarihinde alındı
- Gallardo, A., Bovea, M., Colomer, F., Prades, M., & Carlos, M. (2010). Comparison of Different Collection Systems for Sorted Household Waste in Spain. 10 22, 2019 tarihinde alındı
- Gebze Belediyesi Temizlik İşleri Müdürlüğü. (2019). <http://www.gebze.bel.tr/tr/dokumandetay/13/35/temizlik-isleri-mudurlugu.aspx>. 08 20, 2019 tarihinde <http://www.gebze.bel.tr>: <http://www.gebze.bel.tr/tr/dokumandetay/13/35/temizlik-isleri-mudurlugu.aspx> adresinden alındı
- Gelibolu, L., & Madran, C. (2013). ÇEVRESEL SORUNLARA DAVRANIŞSAL ÇÖZÜMLER GELİŞTİRİLMESİNDE SOSYAL PAZARLAMANIN KULLANILMASI. *Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 339-357.
- Gül, E., & Ekinci, A. (2002). Çevresel Düzenlemelerin Dış Ticaret ve Rekabet Gücü Üzerine Etkisi. *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi*, 1-10.
- Gündüzalp, A., & Güven, S. (2016). Atık, Çeşitleri, Atık Yönetimi, Geri Dönüşüm ve Tüketici: Çankaya Belediyesi ve Semt Tüketicileri Örneği. 08 20, 2019 tarihinde alındı
- Güneş, A. (2011). Yeni Anayasa Tartışmaları Bağlamında Çevre . *Gazi Üniversitesi Hukuk Fakültesi*

- Dergisi*, 259-283.
- Haklıdır, T. (2007). Bursa İli ve Çevresindeki Termal, Maden ve Yeraltı Sularının Jeokimyasal İncelenmesi.
- Hoornweg, D., & Bhada-Tata, P. (2015). *What A Waste: A Global Review of Solid Waste Management*. 08 20, 2019 tarihinde alındı
- Interreg - IPA CBC . (2020, Eylül 22). <http://www.ipacbc-bgtr.eu/tr/projects-funded/revitalization-abandoned-dump-sites> adresinden alındı
- Jung, C., Matsuto, T., & Tanaka, N. (2006). Flow Analysis of Metals in A Municipal Solid Waste Management System. 10 25, 2019 tarihinde alındı
- Kalaycı, E., Türker, G., & Çağlar, E. (2019). Kırklareli İlinin Hayvansal Atık Potansiyelinin Biyogaz Üretimi Çerçevesinde Değerlendirilmesi ve Güncel Yapının Yorumlanması. *BEÜ Fen Bilimleri Dergisi*, 1489-1497.
- Kanlı, İ. B., & Başköy, D. (2018). Küreselleşme ve Çevre Sorunları Bağlamında Göç: İklim Mültecileri. *Siyaset, Ekonomi ve Yönetim Araştırmaları Dergisi*, 21-39.
- Karaca, C. (2007). Çevre, İnsan ve Etik Çerçevesinde Çevre Sorunlarına ve Çözümlerine Yönelik Yaklaşımlar. *Çukurova Üniversitesi İİBF Dergisi*, 1-19.
- Kırklareli İl Kültür ve Turizm Müdürlüğü. (2020). <https://kirkclareli.ktb.gov.tr/TR-64281/cografya:https://kirkclareli.ktb.gov.tr/TR-64281/cografya.html#:~:text=K%C4%B1rklareli%20%C3%BClkemizin%20ormanlar%C4%B1%20bol%20illerinden,%48'ini%20da%C4%9Flar%20olu%C5%9Fturmakta%C4%B1r.&text=B%C3%B6lgenin%20en%20%C3%B6nemli%20y%C3%BCkseltisini%20olu%C5%9Fturan> adresinden alındı
- Köylü, M. (211). Çevre Sorunlarından Çevre Eğitime. *Eski Yeni Dergisi*, 56-64.
- Meteoroloji Genel Müdürlüğü. (2019). <https://www.mgm.gov.tr/iklim/iklim-siniflandirmalari.aspx?m=BURSA>. 08 19, 2019 tarihinde <https://www.mgm.gov.tr/iklim/iklim-siniflandirmalari.aspx?m=BURSA> adresinden alındı
- Mutlu, E., & Varol, Ç. (2017). Sosyo-Ekonomik Farklılaşma ve Mekânsal Ayırışma: Bursa Metropolitan Alanı Analizi. *MEGARON*, 12(1), 87-105. 05 07, 2019 tarihinde [https://www.journalagent.com/megaron/pdfs/MEGARON\\_12\\_1\\_87\\_105.pdf](https://www.journalagent.com/megaron/pdfs/MEGARON_12_1_87_105.pdf) adresinden alındı
- Nelles, M., Grünes, J., & Morscheck, G. (2016). Waste Management in Germany-Development to a Sustainable Circular Economy? 10 24, 2019 tarihinde alındı
- Özçelik, Ö., & Barut, A. (2017). Uluslararası Çevre Hukukunun Gelişimi ve Türkiye'deki Atık Yönetimi Düzenlemeleri ve Türkiye'nin Avrupa Birliği Mevzuatına Uyum Süreci. *Uluslararası Afro-Avrasya Araştırmaları Dergisi*, 1-32.
- Özer, N. B. (2017). Uluslararası Kuruluşların Sürdürülebilir Kalkınma Politikaları. *Ankara Üniversitesi Sosyal Bilimler Dergisi*, 120-149.
- Öztürk, İ., Özabalı, A., & Tezer, H. (2010). *Entegre Katı Atık Yönetimi*. İstanbul: İstaç Yayınları.
- Ramusch, R., Pertl, A., Scherhauser, S., & Schmied, E. (2015). Modelling Informally Collected Quantities of Bulky Waste.
- Sarıkaya, H. Z. (2004). Avrupa Birliği Uyum Sürecinde Çevre Politikaları ve Uygulamaları. *Su Kirlenmesi Kontrolü Dergisi*, 1-10.
- Sıfır Atık Projesi. (2019). <https://sifiratik.gov.tr/>. 08 21, 2019 tarihinde <https://sifiratik.gov.tr/> adresinden alındı
- Solo Resource Recovery. (2019). <https://www.solo.com.au/>. 08 20, 2019 tarihinde



- <https://www.solo.com.au/>: <https://www.solo.com.au/> adresinden alındı
- T.C. Başbakanlık Avrupa Birliği Genel Sekreterliği. (2010). *Avrupa 2020 Stratejisi Akıllı, Sürdürülebilir ve Kapsayıcı Büyüme için Avrupa Stratejisi Özet Bilgi Notu*. Ankara: T.C. Başbakanlığı .
- T.C. Çevre ve Şehircilik Bakanlığı. (2014, 12 31). Atık Getirme Merkezi Tebliği. Ankara: Resmi Gazete. 09 20, 2019 tarihinde <http://www.resmigazete.gov.tr/eskiler/2014/12/20141231M4-18.htm> adresinden alındı
- T.C. Çevre ve Şehircilik Bakanlığı. (2015, 04 02). Atık Yönetimi Yönetmeliği. Ankara: Resmi Gazete. 04 02, 2019 tarihinde <http://www.resmigazete.gov.tr/eskiler/2015/04/20150402-2.htm> adresinden alındı
- T.C. Çevre ve Şehircilik Bakanlığı. (2017). *Ulusal Atık Yönetimi ve Eylam Planı 2023*. 08 21, 2019 tarihinde [https://webdosya.csb.gov.tr/db/cygm/haberler/ulusal\\_at-k\\_yonet-m--eylem\\_plan--20180328154824.pdf](https://webdosya.csb.gov.tr/db/cygm/haberler/ulusal_at-k_yonet-m--eylem_plan--20180328154824.pdf) adresinden alındı
- T.C. Strateji ve Bütçe Başkanlığı. (2019). *11. Kalkınma Planı*. 08 21, 2019 tarihinde alındı
- Talu, N. (2001). *Avrupa Birliği Çevre Politikası*. İstanbul: İstanbul Bilgi Üniversitesi Yayınları.
- Tezel, Ö., & Yıldız, E. (2020). Sürdürülebilir Atık Yönetimi Uygulamalarında Dünya Ve Türkiye Karşılaştırması: Edikab Örneği. *Sosyal Bilimler Araştırma Dergisi*, 35-48.
- Toprak, D. (2006). Sürdürülebilir Kalkınma Çerçevesinde Çevre Politikaları ve Mali Araçları. *Süleyman Demirel Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 146-169.
- Trakyaka. (2012). *TR21 Trakya Bölgesi Enerji Raporu*. Tekirdağ: Trakya Kalkınma Ajansı.
- Trakyaka. (2016). *TR21 Trakya Bölgesi Strateji Planı*. Tekirdağ: Trakya Kalkınma Ajansı.
- Trakyaka. (2017). *TR21 Düzey 2 Bölgesi Trakya Bölge Planı 2014-2023*. Tekirdağ: Trakya Kalkınma Ajansı.
- Tulsa Authority for Recovery of Energy (TARE). (2019). <http://www.tulsarefuse.org/>. 08 20, 2019 tarihinde <http://www.tulsarefuse.org/>: <http://www.tulsarefuse.org/> adresinden alındı
- TÜİK. (2018). *İllere Göre Nüfus ve Yıllık Ortalama Nüfus Artış Hızları 2017-2023*. Ankara: TÜİK.
- TÜİK. (2019). *İl ve İlçelere Göre İl/İlçe Merkezi, Belde/Köy Nüfusu ve Yıllık Nüfus Artış Hızları*. Ankara: TÜİK.
- Türkiye Değerlendirilebilir Atık Malzemeler Sanayicileri Derneği. (2019, 05 02). Geri Dönüşüm Seferberliği Başladı. 09 23, 2019 tarihinde alındı
- Türkiye Sınai Kalkınma Bankası. (2019, 05 02). Atıkta Değer Var. 09 23, 2019 tarihinde alındı
- Uludağ Elektrik Dağıtım A.Ş. (2019). <http://www.uedas.com.tr/sayfa.asp?mdl=sayfalar&id=109>. 05 09, 2019 tarihinde <http://www.uedas.com.tr/sayfa.asp?mdl=sayfalar&id=109> adresinden alındı
- URBANREC. (2019). <http://urbanrec-tr.org/>. 08 20, 2019 tarihinde <http://urbanrec-tr.org/>: <http://urbanrec-tr.org/> adresinden alındı
- Vandepotte, A. (2019). Re-Use Centers in Flanders. 10 22, 2019 tarihinde alındı
- Yalılı, M., & Akal Solmaz, S. K. (2004). Su Temini Tesislerinin Tarihsel Gelişimi Sürecinde Bursa İli. *Uludağ Üniversitesi Mühendislik-Mimarlık Fakültesi Dergisi*, 9(1), 171-181. 08 21, 2019 tarihinde <https://dergipark.org.tr/download/article-file/202859> adresinden alındı
- Yaman, K., & Gül, M. (2018). Kuruluşundan Günümüze Avrupa Birliği'nin Çevre Politikası. *Ekonomi, İşletme ve Yönetim Dergisi*, 198 - 217.
- Yaydırğan, T. (2018). Mahalli İdareleri İçin Evsel Katı Atık Tarife Belirleme Yöntemi. 08 19, 2019 tarihinde alındı
- Zeller, V., Towa, E., & Degrez, M. (2018). Urban Waste Flows And Their Potential For A Circular



- Economymodel At Cityregion Level. 10 25, 2019 tarihinde alındı
- Nelles, M, J Grünes , ve G Morscheck. «Waste Management in Germany-Development to a Sustainable Circular Economy?» 2016.
- Ramusch, R, A Pertl, S Scherhauser, ve E Schmied. «Modelling Informally Collected Quantities of Bulky Waste.» 2015.
- Sıfır Atık Projesi. <https://sifiratik.gov.tr/>. 2019. <https://sifiratik.gov.tr/> (erişildi: 08 21, 2019).
- Solo Resource Recovery. <https://www.solo.com.au/>. 2019. <https://www.solo.com.au/> (erişildi: 08 20, 2019).
- T.C. Çevre ve Şehircilik Bakanlığı. «Atık Getirme Merkezi Tebliği.» Ankara: Resmi Gazete, 31 12 2014.
- . «Atık Yönetimi Yönetmeliği.» Ankara: Resmi Gazete, 02 04 2015.
- T.C. Çevre ve Şehircilik Bakanlığı. «Ulusal Atık Yönetimi ve Eylam Planı 2023.» 2017.
- T.C. Strateji ve Bütçe Başkanlığı. «11. Kalkınma Planı.» 2019.
- Tulsa Authority for Recovery of Energy (TARE). <http://www.tulsarefuse.org/>. 2019. <http://www.tulsarefuse.org/> (erişildi: 08 20, 2019).
- Türkiye Değerlendirilebilir Atık Malzemeler Sanayicileri Derneği. «Geri Dönüşüm Seferberliği Başladı.» 02 05 2019.
- Türkiye Sınai Kalkınma Bankası. «Atıkta Değer Var.» 02 05 2019.
- Uludağ Elektrik Dağıtım A.Ş. <http://www.uedas.com.tr/sayfa.asp?mdl=sayfalar&id=109>. 2019. <http://www.uedas.com.tr/sayfa.asp?mdl=sayfalar&id=109> (erişildi: 05 09, 2019).
- URBANREC. <http://urbanrec-tr.org/>. 2019. <http://urbanrec-tr.org/> (erişildi: 08 20, 2019).
- Vandepotte, Anne . «Re-Use Centers in Flanders.» 2019.
- Yaydırgan, Tuğçe. «Mahalli İdareleri İçin Evsel Katı Atık Tarife Belirleme Yöntemi.» 2018.
- Zeller, Vanessa , Edgar Towa, ve Marc Degrez. «Urban Waste Flows And Their Potential For A Circular Economymodel At Cityregion Level.» 2018.



Annex: 1

## KIRKLARELİ EXCHANGE OF COMMERCE

### Survey Study on the Prevention of Illegal Dumping and Their Impact on Business Development and Commercial Life

*Within the scope of the Revitalization of Abandoned Dumpsites Project carried out by Kirklareli Exchange of Commerce's Cross-Border Cooperation, Bulgaria-Turkey Cross-Border Cooperation Program, a survey will be applied in order to determine the current level of awareness on nature protection in villages. The survey will be conducted among the people living in 50 villages of Kirklareli (The Questions are inspired by the survey conducted by the Own Your Own Waste Foundation for Üsküdar Municipality.)*

<b>Name &amp; Surname:</b>	<b>Age of the Person Surveyed:</b>
<b>Name of the Village:</b>	

### SURVEY QUESTIONS

- |  |   |
|--|---|
| <p>1- Do you like the village you live in?</p> <p>a) Yes</p> <p>b) No</p><br><p>2- Do you think there is a garbage problem in your village?</p> <p>a) Yes, there is</p> <p>b) No, there isn't</p> <p>c) I don't know</p> <p>d) Doesn't concern me</p><br><p>3- If there is a garbage problem in your village, what do you think is the solution to this problem?</p> <p>a) With training and raising awareness</p> <p>b) With laws, sanctions and penalties</p> <p>c) By cleaning / collecting garbage more often</p><br><p>4- Domestic garbage:</p> <p>a) I drop it in front of the door</p> <p>b) I drop it at a point where everybody dumps garbage on the street or next to a garbage container.</p> <p>d) I throw it in the garbage container</p><br><p>5- If you do not use the garbage container, why?</p> <p>a) It is so dirty, I don't wanna get close or touch.</p> <p>b) It is far, I don't want to walk there.</p> <p>c) Containers are always full.</p> | <p>6- I separate the garbage while throwing it away.</p> <p>a) Yes</p> <p>b) No</p><br><p>7- Do you litter?</p> <p>a) Yes</p> <p>b) No</p> <p>c) I don't remember</p><br><p>8- What kind of garbage or waste you see most often in your village?</p> <p>a) Gum</p> <p>b) Kitchen waste</p> <p>c) Plastic bottles and other packages</p> <p>d) Glass beverage bottles and metal cans</p> <p>e) Cigarette butts</p> <p>f) Other (please specify) .....</p><br><p>9- When I see someone littering:</p> <p>a) I warn them by saying "Excuse me, you dropped something"</p> <p>b) I decide whether to warn by the type of the person littering</p> <p>c) I pick up the garbage and throw it in the garbage container</p> <p>d) I get angry but I don't do anything</p><br><p>10- I complain to the relevant units when I witness activities that cause environmental pollution or the destruction of natural resources.</p> <p>a) Yes</p> <p>b) No</p> |
|--|---|



# REVITALIZATION OF ABANDONED DUMPSITES PROJECT RESEARCH REPORT