

# Green Transformation in Industry, Green Collar Professions and Adaptation Possibilities of Syrian Immigrants to This Process: A Case Study

**Nevin KARAHAN**

Bursa Uludağ University, Türkiye, [nkarahan@uludag.edu.tr](mailto:nkarahan@uludag.edu.tr)

**Mehmet KARAHAN**

Bursa Uludağ University, Türkiye, [mkarahan@uludag.edu.tr](mailto:mkarahan@uludag.edu.tr)

## Abstract

This study focuses on various aspects of the Green Transformation Process, including green transformation practices, industrial green transformation, the Green Deal, global developments, new jobs related to green transformation (green jobs), the Green Deal Action Plan, and evaluations of Bursa and Türkiye from a global perspective. It investigates and compiles information on the lives and employment processes of Syrian migrants under temporary protection in Bursa. Additionally, an action plan has been developed for the adaptation of individuals under temporary protection to the new jobs emerging from the green transformation process. For this purpose, the study first examines green transformation and green professions, followed by an analysis of the employment needs of Syrian migrants who have come to Türkiye. Research has been conducted on both the migration phenomenon and the processes of green transformation and green jobs.

## Keywords

green transformation, green jobs, Syrian immigrants, need analysis

## 1. Introduction

Türkiye's green transformation process encompasses a series of strategies aimed at increasing environmentally friendly practices and renewable energy sources to achieve sustainable development. Green transformation involves businesses adopting more environmentally friendly business models by making substantial changes to their production methods and management practices with an awareness of environmental and sustainability principles.

Today, green transformation has become a widely discussed concept globally. Discussions range from the green transformation of the world to that of nations, governments, unions, organizations, institutions, and individuals. Businesses that renew their existing processes by considering the needs of society and nature can ensure the sustainability of their production while minimizing harm to the environment, thereby securing a healthy future.

The primary goal of green transformation is to harmonize production processes with nature in a world where natural resources are limited, and water supplies are depleting. Achieving this harmony is critical not only for preserving nature but also for ensuring the sustainability of businesses.

Türkiye plans to accelerate its green transformation process with its 2053 net-zero emissions target. This process aims to support economic growth at the national level while addressing environmental issues. Green transformation has the potential to create not only environmental benefits but also new job areas and economic opportunities. These job areas, known as **Green-Collar Professions**, represent a new field and opportunity.

These emerging professions, with their relevance and career opportunities, are expected to be among the most appealing and high-potential fields for employment in the near future. The competitiveness of sectors depends on many factors. In our previous studies [1-11], we evaluated many factors regarding the competitiveness of sectors in Bursa. Unlike previous studies, in this study we have made an approach regarding the effects of the green transformation process on the competitiveness of sectors and the new professions that this process will create. This approach is about the new professions that the green transformation will create. However, a second issue in industrial cities like Bursa is the difficulty of

accessing the personnel to be employed. Syrian immigrants provide a human resource in this regard, and they also need to be subject to a serious training program in order to be employed in green professions.

The goal of this study is to explore the potential of green-collar professions and to focus on vocational training and employment opportunities in these fields for Syrian immigrants. This approach will not only create human resources within the newly developing green-collar professions but also enable Syrian immigrants to secure decent jobs in these emerging sectors.

## 2. Key Elements of Green Transformation

### 2.1. European Green Deal

A crucial consideration for businesses aiming to access the markets of European Union (EU) member states is the ongoing economic transformation process framed by the European Green Deal. Announced on December 11, 2019, the EU has set the ambitious goal of becoming the first climate-neutral continent by 2050. To achieve this, the EU declared its intention to adopt a new growth strategy and reshape all its policies around the axis of climate change.

The European Green Deal (EGD) represents one of the EU's most significant initiatives since the establishment of the Single Market, encompassing substantial changes in various areas, including industry, finance, energy, transportation, buildings, and agriculture.

Another critical aspect of the Green Deal is the transition to a **circular economy**, which will impact all relevant product legislations. On March 10, 2020, the EU unveiled its Circular Economy Action Plan. This plan emphasizes introducing new rules covering the entire lifecycle of materials and products, from raw material sourcing to production, consumption, and waste management. The priority sectors under this theme include electronics and information technology, batteries and vehicles, packaging, plastics, textiles, construction and buildings, and food, water, and nutrients.

Within this framework, the EU aims to establish common rules to ensure products are more durable, repairable, low-carbon, free from harmful chemicals, and recyclable. Key objectives include:

- Defining sustainability-oriented standards that products must meet to be marketed in the EU;
- Providing product-related information that is easily accessible to consumers, market surveillance authorities, and the recycling sector;
- Developing "digital product passports" to accompany products, ensuring transparency;
- Introducing mandatory green public procurement criteria.

The EU's Circular Economy Action Plan also envisions preparing legislative proposals for all products, starting with priority product groups. Initial legislation and strategies have been introduced for these groups, aiming to set mandatory requirements and general frameworks for sustainability criteria, covering the entire lifecycle of products, from design to disposal.

### 2.2. Green Deal Industry Plan

The Green Deal Industrial Plan was announced by the European Commission on February 1, 2023, to support Europe's net-zero emissions target, enhance industrial competitiveness, and accelerate the transition to a climate-neutral economy. This plan outlines a policy framework designed to facilitate the green transformation of the industrial sector and ensure investments necessary for the transformation of the economy. The plan is intended to complement ongoing efforts within the scope of the European Green Deal (EGD), the EU Industrial Strategy, and particularly the Circular Economy Action Plan.

One key objective of the plan is to control uncontrolled waste exports to third countries while simultaneously fostering the integration of existing waste within the EU as a resource into the economy. This approach aligns with the broader goals of supporting the circular economy and strengthening sustainable practices across the EU industrial landscape.

The plan aims to provide a clear framework to promote the adoption of green technologies and support the transformation of industry in a way that balances competitiveness with sustainability, contributing significantly to achieving the EU's ambitious climate goals.

### 2.3. Green Growth and Green Transformation

The concepts of **green growth** and **green transformation**, referred to as "environment-focused sustainable economic growth," are gaining increasing importance. According to the OECD (Organisation

for Economic Co-operation and Development), green growth refers to ensuring that natural assets continue to provide the resources and environmental services upon which our well-being depends, while simultaneously fostering economic growth and development.

The concept of green transformation, on the other hand, promotes the transition to less carbon-intensive systems and the encouragement of a decarbonized global economy, primarily through the use of renewable energy sources.

These concepts, developed to address climate change and the efficient use of resources, encompass both economic and environmental sustainability. The green transformation framework calls for the environmental design of all economic activities, especially responsible production and consumption, and encompasses a broad set of practices, including:

- Resource efficiency in production (eco-efficiency);
- Use of renewable energy sources (phasing out fossil fuels);
- Integration of inclusive policies established at the international level and alignment with sustainable development goals (roadmaps);
- Implementation of digital transformation.
- Development of technological and innovative clean production techniques;
- Creation of sustainable cities;
- Ensuring a just transition.

The overarching goal is to harmonize economic growth with environmental priorities, creating a resilient, low-carbon, and sustainable global economy.

### **3. Methodology**

#### **3.1. Situation of Syrian Immigrants**

The general situation of Syrian immigrants is created using data from the Directorate of Immigration Administration regarding their age, gender, occupational status, educational status and whether they are employed or not.

#### **3.2. Stakeholder Analysis and Company Interviews**

Before conducting needs analysis studies, a preliminary study (Stakeholder Analysis) regarding internal and external stakeholders to participate in the evaluations is required to ensure more efficient execution of the work.

In this context, Stakeholder Analysis was conducted to accurately determine expectations in the selection of content and products to be developed within the scope of this study and to ensure participation, which is one of the fundamental elements of planning. The analysis included collecting input from all parties interacting with "Green Transformation Process" topics.

The Diagnostic Study and Needs Analysis were conducted in two phases: In the first phase, the socio-economic conditions of Syrian immigrants residing in Bursa were analysed. For this purpose, studies on this subject were researched, and the most comprehensive and up-to-date one was selected. During this phase, information was gathered about the educational levels, ages, and other personal characteristics of Syrian immigrants, as well as whether they were employed. This data provides a detailed statistical analysis of Syrian migrants and is considered to form an important database, especially for assessing the potential of Syrian migrants that could be utilized within the project.

In the second phase, a survey was conducted on a company-by-company basis. During this phase, the awareness levels of companies regarding the Green Transformation, their adaptation levels to this topic, and whether they had the necessary human resources to ensure this adaptation were examined. Awareness was also raised about the advantages of having access to human resources aligned with the professions mandated by the Green Transformation process.

Major sectors in Bursa were identified during the survey study, and representative companies from these sectors were selected. In-depth interviews were conducted with senior experts within these firms.

Subsequently, the results of both phases of the Diagnostic Study and Needs Analysis were analysed. The outcomes of both phases were compiled, and the parts relevant to the project were presented statistically.

Before conducting needs analysis studies, a preliminary study is necessary to ensure that the work is carried out more efficiently. Stakeholder Analysis was conducted to identify internal and external stakeholders who would participate in the evaluations. A total of 10 stake holders were interviewed. Stake holders are public institutions operating in the fields of employment, vocational training and certification.

This analysis aimed to ensure that the expectations could be accurately determined in the selection of content and products to be developed within the scope of this study, and to establish participation, which is one of the fundamental elements of planning. By gathering input from all parties interacting with "Green Transformation Process" topics, the analysis facilitated the inclusion of their perspectives. Additionally, this analysis played a key role in identifying the subcategories under the main theme of needs analysis, which is one of the core components of the study.

### 3.3. Diagnostic Study and Statistical Analysis

In this study, selected questions were asked to 154 companies from different sectors via Google Survey and face to face interviews as our previous papers [12, 13]. The results were analysed statistically.

In the diagnostic study, firms directly affected by the green transformation process were carefully selected. Additionally, small and medium-sized enterprises (SMEs) that may not yet be significantly affected but are likely to become part of this process in the future were included. A semi-structured survey was used during interviews, enabling firms to respond more openly and focus on their specific needs. The primary need identified for companies is to ensure that the Green Transformation process does not negatively impact their competitiveness but instead enhances it by discovering new opportunities in this field. Companies urgently require systematic approaches to address these challenges.

This necessity clearly demonstrated the demand for human resources specializing in green transformation. It also highlighted the importance of training individuals for new job categories that can be classified as **Green-Collar** professions.

## 4. Results

### 4.1. Current Situations of Syrian Immigrants

Migration is a global issue that continues to expand and concerns the entire world. According to the United Nations (UN General Assembly Report, 2017: 2), there are 258 million international migrants globally, with a large portion resulting from regular migration waves. Since 2000, the migrant population has increased by an estimated 49%, surpassing the global population growth rate of 23%. The proportion of migrants worldwide has risen from 2.8% to 3.4%, and this upward trend is expected to continue in the coming years [16].

Between January and August 2024, the number of Syrians in Türkiye increased by 126,766 people. There are approximately 3,103,606 Syrians immigrants in Türkiye, consisting of 1,613,657 males and 1,489,949 females. In Bursa specifically, there are approximately 170,000 Syrian immigrants. The distribution of age groups of Syrian immigrants is approximately as follows: individuals aged 18-25 constitute 26%, while those in the 26-30 age group make up 18%. The 31-35 and 36-40 age groups comprise 16% and 16.5%, respectively. The percentage drops in older age groups, with 7.5% in the 41-45 age group, 5% in the 46-50 age group, 4% in the 51-55 age group, and 8% in those aged 56 and above.

The proportion of young refugees, specifically those aged 18-30, is 44%, representing nearly half of the total refugee population. Age, as a demographic indicator, is a key factor in societal integration. Integration becomes more challenging as age increases. Therefore, policies focused on the integration of the young population are likely to provide significant future benefits for the country.

The distribution of Syrian immigrants according to their educational status is approximately as follows: 5.5% of the refugees have never attended school, 22% have completed primary school, 38% have completed middle school, 22% have completed high school, and 14% hold a university degree.

The professions of Syrian immigrants in Bursa are very interesting. The professions distribution of Syrian immigrants in Bursa as follow: 41.5% of the immigrants are unemployed, 5% are students, 14% are housewives, 21% are workers, 11% are tradesmen, 6.5% are in professional careers, and finally, 1% are businesspersons. Based on the classification, those working as blue-collar workers or self-employed are categorized as workers; those self-employed in crafts such as tailoring or shoemaking are categorized as tradesmen; those employed in professions requiring a certain level of education, such as

engineers, teachers, or interpreters, are categorized as professional careers; and those operating in commerce or industry are categorized as businesspersons.

#### 4.2. Company Analysis

In the survey study, major sectors in Bursa were identified, and companies representing these sectors were determined. Visits were conducted to these companies, including energy firms. In-depth interviews were held with senior experts in these companies. Subsequently, an analysis of the results of the two phases of the Diagnostic Study and Needs Analysis was conducted. The results of both phases were compiled and the statistically relevant parts for the project are presented below.

154 companies were visited during the diagnostic study, and sectors expected to be directly affected by the Green Transition process were prioritized in the selection of these companies. Within this scope, the sectors of the participating institutions and organizations were specified. Of the companies that participated in the survey, 22% belong to the Automotive Sector, 22% to Machinery Manufacturing, 20% to the Textile Sector, 16% to the Service Sector, 12% to Plastic Manufacturing, 6% to the Energy Sector, and 2% to the Glass Industry. As shown, these sectors have a high potential to be affected by the Green Transition process.

Figure 1 shows the total number of employees in the companies participating in the survey. In this context, 73% of the companies participating in the survey are SMEs with 50 or more employees. Additionally, 20% are large-scale enterprises with 500 or more employees.

Figure 2 indicates whether the companies participating in the survey employ Syrian migrants or not. In this context, 58% of the 50 companies involved in the diagnostic study employ Syrian migrants. This ratio reflects a general measure of the proportion of businesses in Bursa employing Syrian migrants.

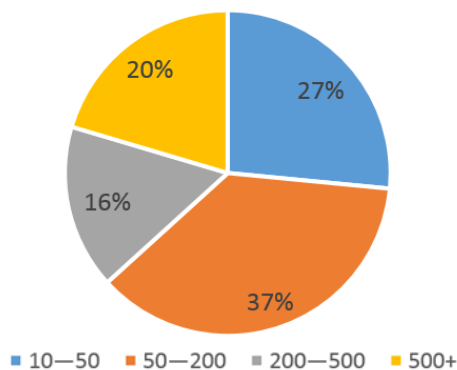


Fig. 1. Total number of employees distribution in companies

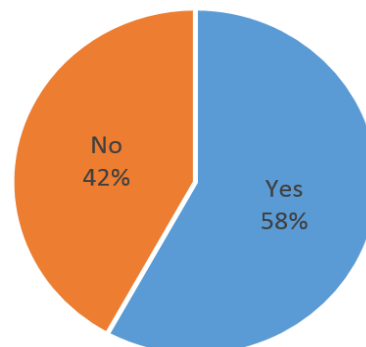


Fig. 2. Proportion of Syrian employees in companies

Figure 3 shows the number of Syrian migrant employees in the companies participating in the diagnostic study. The figures in the graph represent individuals officially registered with the Social Security Institution and holding work permits. In this context, 45% of the companies involved in the needs analysis employ five or more Syrian migrants. This ratio is a significant indicator for Syrian migrant employment. In Bursa, there are numerous businesses employing Syrian migrants, where individuals completing vocational training in Green Collar Professions at Bursa Chamber of Commerce and Industry Education Foundation (BUTGEM) can be employed.

Figure 4 shows the educational status of Syrian migrants under temporary protection in the companies participating in the survey. Among the migrants in the companies involved in the demand analysis, 48% have a high school education or higher. This ratio indicates that the Syrian migrant population in Bursa has a high level of qualifications.

Figure 5 shows the occupational fields with high staff turnover in the companies participating in the survey. The intense turnover in blue-collar occupational fields can be addressed with Syrian migrant participants who have received vocational training in institutions such as BUTGEM and have a high level of social integration.

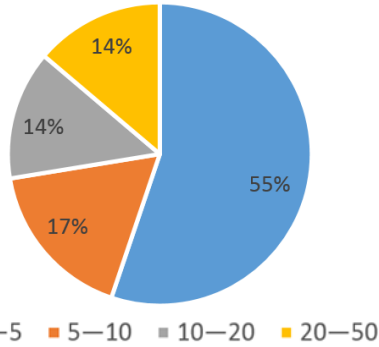


Fig. 3. Number of Syrian migrant employees

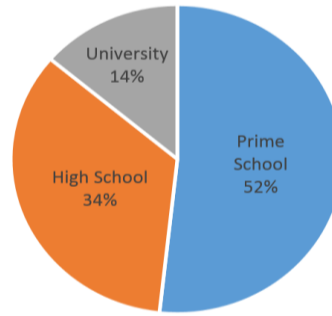


Fig. 4. Educational status of Syrian migrants

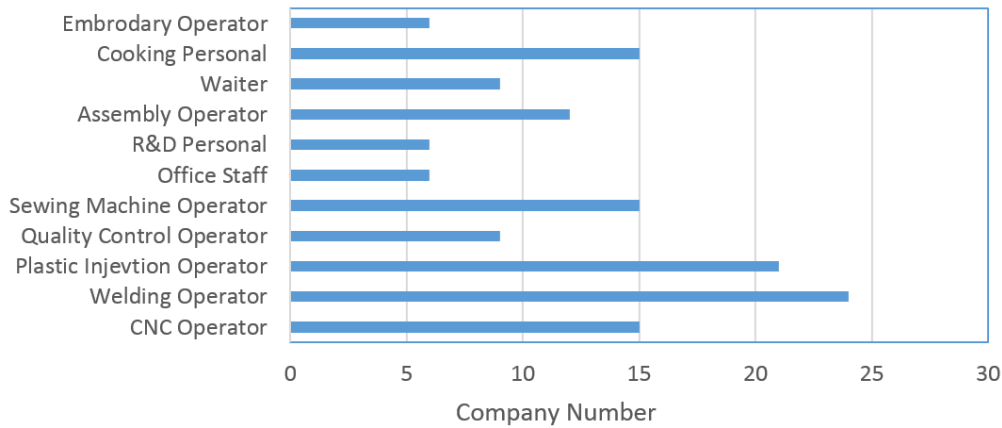


Fig. 5. Occupational groups with high personnel demand

Figure 6 indicates the potential employment of Syrian migrants by the companies participating in the survey. In this context, 80% of the surveyed companies stated that they could employ Syrian migrants. A more detailed analysis shows that 72% could employ between 1 and 10 Syrian migrants, while 8% indicated that they could employ 10 or more Syrian migrants.

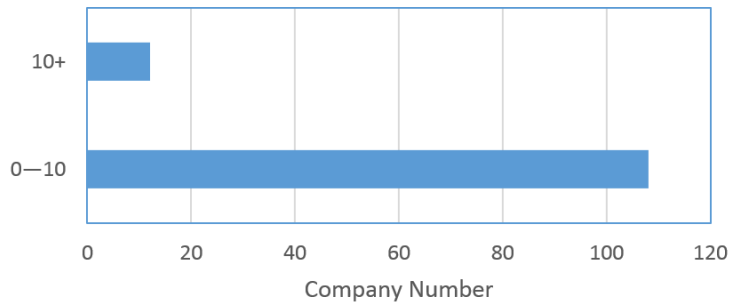


Fig. 6. Demand for Syrian migrants in employment

Figure 7 illustrates the preparedness of the companies participating in the survey regarding the Green Transformation. In this context, 70% of the surveyed companies stated that they are prepared for the Green Transformation. Although the proportion of companies prepared for the Green Transformation is high, all the companies involved in the diagnostic study need support for Green Transformation and its processes, as it is a relatively new field both globally and in Turkey. They seek this support from institutions like BUTGEM.

Figure 8 indicates the areas of focus for businesses that have initiated Green Transformation preparation processes among the companies participating in the survey. According to this chart, 42% of businesses in Bursa have prioritized processes related to Solar Energy Systems (GES), Carbon Footprint Calculation, and Zero Waste.

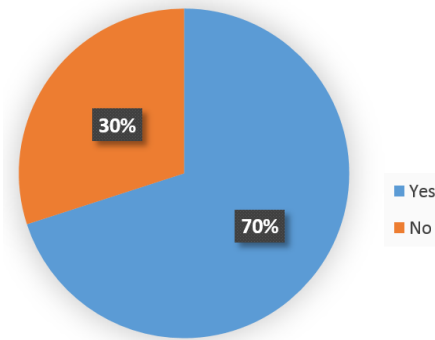


Fig. 7. Companies' Green Transformation preparedness

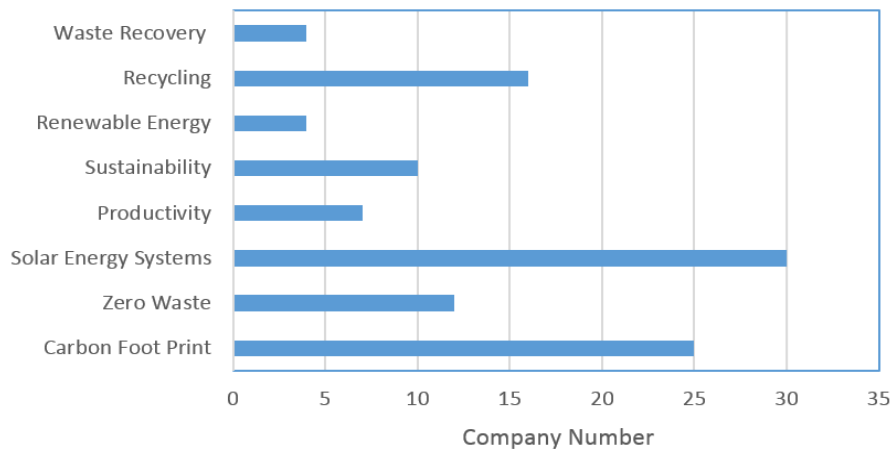


Fig. 8. Companies' Green Transformation preparation processes

Figure 9 illustrates the areas where companies participating in the diagnostic study most wish to employ personnel during the Green Transformation process. In this context, 36% of the companies indicated a need for personnel in the field of Sustainability.

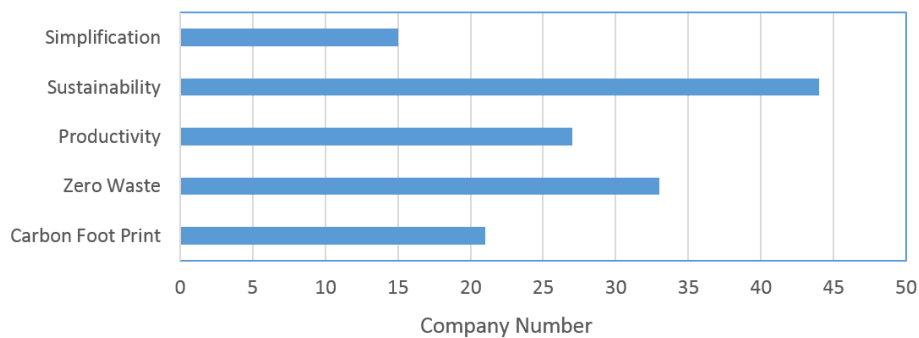


Fig. 9. Employment demand for green jobs

Figure 10 indicates the areas in which the firms participating in the diagnostic study wish to receive training related to the Green Transition. In this context, 42% of the firms expressed a desire to receive training on Green Transition in industry.

## 5. Green-Collar Jobs

### 5.1. Workforce Needs of Türkiye within the Scope of Green Transformation

The green transition is a vital tool for achieving sustainable development goals. As a critical step in solving global environmental issues, the Green Transition serves as a significant instrument in addressing these challenges. Consequently, international organizations, governments, the business

world, and civil society organizations are working collaboratively to contribute to the construction of an environmentally-conscious economic system and to support the transition process to a green economy. However, the impacts and needs that the green transition creates in the labor market are increasingly becoming a globally debated topic.

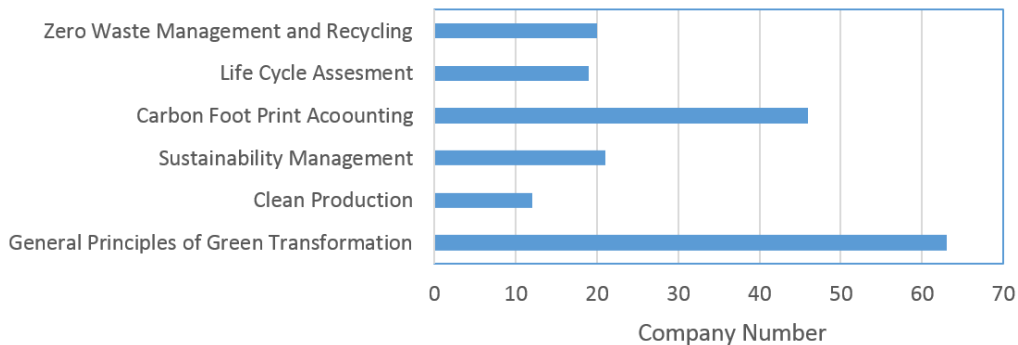


Fig. 10. Green Transition training groups

It is evident that there is a need for a new economic system that values the environment to avoid the damages caused by climate change and environmental degradation, achieve sustainable development goals, and leave a healthy planet for future generations. This new economic system inevitably affects labor as a production factor and, therefore, impacts the labor market. The readiness of labor markets, which are inherently human-centered, for this transition and how they will respond to it are critically important.

To achieve sustainable development goals within the framework of the green transition, a shift to environmentally-friendly jobs, also known as green jobs, is necessary. These jobs range from producing eco-friendly products to specializing in energy efficiency. Indeed, green jobs encompass a wide range of fields such as renewable energy, energy efficiency and insulation, sustainable agriculture and food production, recycling and waste management, and green construction and building materials.

### 5.2. Definitions and Key Concepts for Green Jobs

The growing global environmental issues, such as climate change and the depletion of natural resources, have necessitated the establishment of a new economic system sensitive to the environment. Green jobs, or environmentally-friendly jobs, have emerged to address these challenges. In this context, the concept of "Green Jobs" can be defined as job fields that sustain economic activities based on principles of environmental sensitivity and sustainability. As environmental awareness increases, job sectors focusing on areas like waste management, energy efficiency, and renewable energy have developed. The importance of environmentally-friendly jobs, referred to as green jobs, in preventing environmental problems has accelerated the transformation of jobs associated with traditional production methods. In this framework, it is useful to mention the concept of "brown jobs," which correspond to traditional production methods. These jobs are defined as "jobs that do not use raw materials efficiently, do not prioritize energy efficiency, continue production dependent on fossil energy sources, and fail to provide decent work standards". Sustainability and environmental issues are becoming increasingly important topics for our world. From this perspective, replacing brown jobs with environmentally-friendly jobs, known as "Green Jobs," which support decent working conditions and are sensitive to environmental issues, appears to be essential for addressing current problems.

### 5.3. Present and Future Professions

The concept of green jobs encompasses a broad area as it includes activities and sectors that promote environmental sustainability. Therefore, there are differing opinions on what exactly constitutes green jobs, the sectors and activities they include, and the criteria used to define them. In our interviews with both companies and stake holders, different opinions were expressed about green-collar professions. The most frequently mentioned professions are given in Table 1. Of course, green-collar professions will not be limited to these. However, when sectoral demands are taken into consideration for now, the professions in Table 1 come to the fore. The common point of green job definitions is their evaluation as jobs that have



direct and positive impacts on the environment. Moreover, green jobs should not only contribute to environmental sustainability but also protect people's rights and provide them with fair working conditions.

Table 1. Green jobs of the future

1	Environmental Engineering	9	Renewable Energy Engineering
2	Landscape Architecture	10	Solar Technician
3	Urban Agriculture	11	Organic Agriculture Engineering
4	Conservation Science	12	Carbon Sales Specialist
5	Green Investment	13	Wind Turbine Maintenance Specialist
6	Wind Turbine Technician	14	Green Design Specialist
7	Electrical Panel Manufacturer	15	Green Marketing Consultancy
8	Wind Energy Technician	16	Carbon Sales Specialist

The notable point here is that a green job should provide both financial and emotional support to individuals in order to help those with lower income levels secure employment in more skilled jobs, in addition to its positive impacts on the environment and climate. On the other hand, green jobs should not only benefit individuals but also have macro advantages, especially in terms of reducing the negative impacts of the climate crisis. In this context, environmentally friendly jobs, referred to as Green Jobs, bring numerous advantages, including environmental sustainability, employment opportunities, improvement of work and life quality, innovation, energy efficiency, social justice, and combating climate change.

Table 2 shows the advantages that green jobs offer in the transition towards an environmentally friendly economy. These advantages demonstrate that green jobs provide benefits from economic, environmental, and social perspectives.

Table 2. Green jobs and the benefits of green transition

Economic	-Increased productivity -Creation of new employment opportunities
Environmental	-Low carbon usage -Utilization of work areas -Natural resource management
Social	-Energy security -Social equality -Decent work for all

**Economically**, Green Jobs promise that future jobs will increase productivity and create new employment opportunities. With the use of more efficient production processes and technologies, economic growth and employment are expected to be positively impacted.

**Environmentally**, green jobs promise the effective use of natural resources and the establishment of a system focused on low carbon usage. Green jobs involve energy efficiency, the transition to renewable energy sources, waste/pollution reduction, and environmentally friendly production methods, all of which are crucial for environmental sustainability.

**Socially**, green jobs aim to increase social equality and jobs that meet decent work standards. This involves ensuring fair wages, creating safe working conditions, protecting workers' rights, and fostering jobs that contribute to the overall well-being of society.

The advantages brought by the green transition show that green jobs play a significant role in sustainable economic development. These jobs promote economic growth while supporting environmental sustainability and social justice.

## 6. Conclusions

This paper provides a comprehensive analysis of the impacts of the green transformation process on the labour market and the opportunities specific to Bursa. It is observed that efforts to achieve environmental sustainability goals are not limited to technical elements such as natural resource

management and energy efficiency, but also include social integration and human resource development processes. The presence of Syrian refugees under temporary protection in Bursa represents a significant potential that can be leveraged in the green transformation process. The integration of these individuals into the labour market supports social cohesion and addresses the region's human resource shortages. Research shows that training and employing Syrians in green-collar jobs can make significant contributions to achieving economic growth and sustainability goals. Sectors such as energy efficiency, renewable energy projects, recycling, and waste management are among the critical areas where the skills of these migrants can be developed and utilized. According to the findings of the report:

- 48% of Syrian refugees have a high school education or higher, which offers a significant advantage in terms of vocational training and labour market integration;
- Green-collar jobs support both economic and social sustainability with decent working conditions;
- 70% of businesses in Bursa have started preparations for green transformation, and there is an increasing need for qualified labour in this process.

In this context, the following strategies are important for Syrians to play an active role in the green transformation process:

- 1) Expanding Vocational Training Programs: vocational trainings in areas such as recycling, renewable energy, and energy efficiency should be organized to accelerate migrants' adaptation to these fields;
- 2) Social Awareness Initiatives: projects highlighting the contributions of Syrians should be promoted to support social cohesion and reduce prejudices;
- 3) Collaboration with Employers: incentive mechanisms should be developed for businesses in Bursa to benefit from the skills of Syrian refugees;
- 4) Public and Private Sector Support: collaboration between the public and private sectors should be strengthened to train qualified labour for the green transformation.

In conclusion, it is clear that the green transformation process not only aims to achieve environmental goals but also supports social development and human resource development. The effective involvement of Syrian refugees in this process will play a key role in helping Bursa achieve both its environmental and social sustainability goals.

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