Migration flows, competences, and the energy transition: trend and best practices in training and work inclusion in the Fondazione MAIRE – ETS research project

FONDAZIONE MAIRE

TRAJECTORIES

Migration flows, competences, and the energy transition: trends and best practices in training and work inclusion in the Fondazione MAIRE - ETS research project

INDEX.

FOREWORD

Energy transition and migration: challenges and opportunities for businesses in the third millennium

Fabrizio Di Amato,
Chairman of Fondazione MAIRE – ETS

The energy transition is an irreversible process that will proceed at different speeds around the world and in a fluctuating manner over the coming decades, but it will not stop. Companies that in recent years have invested in the development of innovative technical and technological solutions for decarbonization and circularity, in the transition to renewables, in modifying their production processes, and in the *design* of their products to reduce their carbon impact will continue to work in this direction, albeit perhaps in a non-linear way, gradually changing the type of skills they need in their workforce as a result.

To address this profound change, a change that is surely not going to stop and that cuts across production systems and through society, affecting production, distribution, and consumption models, with a strong component of complexity and uncertainty management, we need characteristics such as vision, problem solving, multiculturality, intellectual curiosity, the ability to cooperate, and a great deal of flexibility and resilience. And these characteristics are required across the organizations, not just within management.

Today, in many mature economies, including Italy, we are witnessing a widening gap in the job market that makes some professions difficult

to fill due to a shortage of suitable candidates. Many companies are helping to bridge this gap through their involvement in *non-profit* initiatives in the fields of education, guidance, and training, starting with the youngest age groups.

As the Fondazione MAIRE – ETS, one of our goals is to pioneer socially innovative solutions to draw young people, women, and other groups who would bring added value, toward the energy transition sector, one with great potential for job creation.

This research report outlines an initial step toward understanding the phenomenon; other, more practical steps will follow, through which we want to bring about effective experimentation, and then share the results with the business world, institutions, and social partners.

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INTRODUCTION

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1. The Fondazione MAIRE - ETS and its role in developing the skills needed to address the energy transition

Ilaria Catastini
General Manager of Fondazione MAIRE – ETS

As part of its broad mission, the Fondazione MAIRE – ETS also serves as a center for research on the skills that are needed and will be needed in the coming decades to address the energy transition. We strongly believe that the growth of these skills worldwide is an indispensable factor in achieving climate goals, both in terms of mitigating global warming and adapting to climate change.

The Fondazione MAIRE – ETS looks at the energy transition – and the skills associated with it – particularly from the point of view of the development of low-carbon industrial technologies and plant infrastructure for the production of materials, intermediates, and fuels with a low carbon footprint; technologies aimed at reducing climate-altering emissions in order to help contain global warming.

We therefore see the energy transition in its broadest sense, which certainly includes the production of energy from traditional renewable sources, but also includes the development of a broader energy mix with low or zero emissions, the decarbonization of industrial processes, CO2 capture and utilization processes, the production of chemical products and intermediates and fuels from renewable sources or waste, the production of 'bio' or biodegradable materials, recycling and, in more general terms, circularity.

The MAIRE Group, from which the Fondazione MAIRE – ETS originated in 2021, is strongly committed to the development of technical and technological solutions for the energy transition. The demand for sustainability and for low-carbon, more sustainable processes and products is growing all around the world. The change underway is vast in scope, affecting industry, distribution, economics, commerce, and organization. This change is driving demand for specific technical skills and *soft skills* needed to tackle the enormous challenge of rapidly changing production, consumption, and cultural models in a time frame determined by climate goals.

The skills and knowledge required for this career path include an understanding of issues and aspects related to global warming, energy efficiency, and the circular economy, as well as knowledge of new feedstocks, the limitations and opportunities associated with the development of alternative products, and aspects related to the safety of new processes and substances. Not to mention the ability to consider the economic and financial aspects of change and issues related to digital innovation. In addition to this, in the search for personnel to employ in the energy transition sectors, what is in increasing demand by the global industry, and indeed the global system as a whole including public administration and civil society, are skills such as critical thinking, resilience, *problem solving*, and creativity. All over the world.

This is also confirmed by the research that the Fondazione MAIRE – ETS has been conducting for three years in collaboration with IPSOS, which currently involves 14 countries on four continents. The research offers some very interesting insights into the degree of awareness of the need for skills development for the energy transition in different areas of the world, showing how this awareness is rising in an increasingly evident way, especially in emerging economies,

which are more and more on the lookout for professionals who are knowledgeable on these issues or who can be trained for this purpose.

In this general context, our Foundation has deemed it useful to consider a new line of inquiry, relating to the possibility of training for the integration of migrants into the workforce in the energy transition sector, in the broad sense that we understand it.

This led to the project presented in this report, which was carried out through funding by the Fondazione MAIRE – ETS for eight studies, following a call for proposals published in July 2024.

These studies provide us with a starting point for a targeted training project that draws on the experience of the MAIRE group, which has been making a very important contribution to the training of professionals for years now through a network of collaborations with schools and universities around the world, as well as the experience already gained by the Fondazione MAIRE – ETS, which has several active guidance and training projects on energy transition issues aimed at high school students.

The Fondazione MAIRE – ETS therefore takes an open and long-term view of the whole process, looking at the present but above all at the future, posing no physical or cultural barriers in the search for solutions, whether innovative or yet to be tested.

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PRESENTATION OF THE FINDINGS OF THE RESEARCH PROJECT

2.

2. Migrants, skills and energy transition: European and international perspectives

Andrea Billi
Professor at Sapienza University of Rome

Introduction

The energy transition is one of the most significant challenges of the 21st century, not only in technological and economic terms, but also from a social and employment perspective. The growing demand for ***green skills***, that is to say, specialized skills in the areas of environmental sustainability, renewable energy and energy efficiency, opens up complex scenarios regarding the availability of skilled labor. At the same time, Europe and the United Kingdom are facing significant migration flows, characterized by a plurality of experiences, skills, and expectations (Fortunato, 2025). The job placement of migrants represents both a challenge and an opportunity: a challenge to the legal, linguistic, and cultural barriers that still exist; an opportunity to respond to the workforce *deficit* that the ecological transition inevitably generates. The contributions collected in this volume approach the topic from different perspectives – theoretical, historical, and empirical – offering some insights into the connections between economic and non-economic migration and the *green economy*. In the call for proposals, which gave rise to these contributions, no prior constraints or guidelines in the research approach were given, quite deliberately, in order to leave researchers free to identify and explore the topic according to the perspective they deemed most appropriate and of greatest interest. This approach led to the call for proposals being left open to both young researchers and more structured entities/individuals. This document,

which brings together their respective summaries, has no historical, methodological or related *policy* perspective guiding its presentation, preferring or emphasizing one choice over another. The richness of the contributions stems from the fact that they were free in their approach, enhanced by lateral discussion and exchange between researchers. However, we have tried to synthesize commonalities emerging from the different approaches and possible directions for further exploration and some guidelines on the application of *policy*. If we were to ask ourselves what the strongest element linking this research project as a whole is, the answer is to view the two emergencies (energy transition and migration) as two opportunities that can be seized, as challenges so to speak, from an original and unconventional perspective. From the perspective of the MAIRE group's own history, which has integrated even diverse businesses and markets into single entrepreneurial and industrial projects, this approach fits well, lending credibility and value to it, and perhaps opening up paths and solutions that may find their distinctive strength in the link between migration and energy transition.

State of the Art.
Cecilia Fortunato

The energy transition is profoundly transforming the economic and social environment in Europe, and migration of foreign workers emerges as a crucial element in supporting these changes. Dr. Fortunato's study aims to map the current state of the scientific literature on the link between economic migration and the energy transition, analyzing 3,731 studies published from 1990 to 2025. The goal is to understand how the migrant workforce can contribute to filling labor and skills shortages in *green* sectors, and what are the main challenges related to economic and social inclusion.
The study combines quantitative and qualitative analysis of text-based data. Abstracts of scientific papers were processed using *text mining* and *content analysis* techniques, while probabilistic models made it possible to identify the main research strands and emerging topics. In

parallel, a qualitative analysis delved into a selection of papers directly linking labor migration to the energy transition, with the aim of providing a clear picture of opportunities and critical issues. In essence, a highly original work was carried out to read and codify the growing scientific literature on the subject, which can also be a valuable starting point for further and subsequent studies. Europe, and in particular the Mediterranean area, is characterized by significant environmental and demographic vulnerabilities: extreme climatic events, an aging population, depopulation of inland areas, and low birth rates put pressure on *welfare* systems and the job market. In this context, migration has taken on a structural role: in Italy, as of January 1, 2025, there were 5.4 million legally resident foreigners (8.9 % of the population), with more than 2.5 million active workers, accounting for 10.5 % of employed people. The presence of migrant workers is particularly relevant in agriculture, construction, manufacturing, logistics and service sectors, where they contribute significantly to the production system and economic resilience.

A review of the scientific literature shows that research on employment in green sectors has increased significantly in recent years, especially since the pandemic and energy crisis of 2022. The most studied sectors include *off-grid* renewable energy, electric vehicles, and energy-intensive industries, with a focus on vulnerable and rural areas. However, employment is often treated as a side effect of the transition, while the shortage of skilled workers is a significant constraint. Profiles in demand include engineers, IT specialists, maintenance technicians, and security personnel, with stable roles and competitive wages, but a minimal proportion of studies consider job quality, rights, *welfare*, and worker conditions. The integration of foreign workers into European job markets presents structural challenges: full inclusion takes years, and employment status is strongly influenced by legal status, local regulations, language and cultural barriers. Migrants often face discrimination, occupational segregation, under-employment, and difficulties in recognizing qualifications acquired abroad. In addition,

the most vulnerable groups, such as women and youth, suffer most from these obstacles. Limited community participation and unfamiliarity with institutions worsen their exposure to exploitation and exclusion. Global events such as economic crises, conflicts and border closures further exacerbate migrants' vulnerability.
The research highlights the need for analytical tools and targeted policies for an equitable and inclusive energy transition. Migration of foreign workers cannot be viewed as just a means to fill labor shortages: it must be part of a holistic approach that integrates economic security, training, skill recognition, pathways to social inclusion, and forward-looking migration policies. The public sector has a key role in promoting training, guidance services, and tools for mediating between labor supply and demand, while civil society organizations support the employment and integration of migrants, helping to make the green transition socially sustainable. Only by combining flexible *governance*, migration planning, and harnessing the human capital of migrants will it be possible to contribute to a just, inclusive, and lasting energy transition.

Employment and training of migrant workers in the energy transition: what is really happening.

Antonio Umberto Mosetti

Dr. Mosetti's contribution takes a more practical approach and seeks to understand how migrant workers experience some of the dynamics. In a decidedly more anthropological perspective, it asks how migrants can become “active participants” in the green transformation, and how companies and institutions are developing practices and tools to make their employment effective and sustainable. The research focuses on three main issues: the difficulties in recognizing competencies from one country to another, the importance of targeted training pathways, and the need for job mobility experiences integrated with long-term policies.

Migrant workers already in Europe, often employed in sectors such as construction, logistics, and ICT, provide valuable potential to fill the labor gap in the transition, but require support with appropriate training pathways and skills recognition.
Skills Mobility Partnerships (SMPs), for example, are an innovative model for combining training and job mobility. Those multilateral agreements aim to fill skill shortages in destination countries, enabling migrant workers to acquire specific know-how and fit into green projects effectively. The ILO emphasizes that all occupations can become "greener", and that even entry-level positions play a crucial role in energy transition. Training must therefore integrate technical, language, and digital skills, ensuring transferability of skills across countries. The main challenge remains the recognition of qualifications and certifications: the absence of harmonized standards makes mobility complex and limits long-term job opportunities.
In addition, two projects that provide concrete examples of best practices are explored in the study.

- **SDM4EU** (*Skilled Driver Mobility for Europe*), active from June to December 2024, engaged 18 European and non-European countries to train qualified drivers. The project created shared standards for training and skills assessment, facilitating job mobility, and ensuring transparency in employment conditions. Despite its short duration and the absence of reintegration measures in the countries of origin, SDM4EU demonstrates the possibility of harmonizing multilateral certification processes through co-ordination among institutions, companies and international organizations.

- ***NET-Work You***, which started in April 2024 and runs until 2027, focuses on the agricultural sector and combines technical, language, digital, and soft skills training for young Egyptians. The project involves a three-month internship in Puglia with Italian green companies, followed by the participants' return to Egypt to apply

the skills they have acquired. This integrated approach promotes circularity of training and fosters long-term employability, creating a replicable model of skill recognition and dialogue between workers, companies and policy makers.

The analysis of the projects highlights three key guidelines for enhancing the value of migrant workers in the energy transition::

1. Provide comprehensive training that integrates technical, linguistic, digital and interpersonal skills;
2. Involve different actors – public institutions, businesses, trade unions, international organizations – to create common *standards* and facilitate inclusion in multiple job markets;
3. Ensure mobility experiences integrated with pathways to reintegration in countries of origin, assuring long-term employability.

However, some crucial challenges remain: lack of harmonization of certification systems and productivity-related migration policies limit the scalability and durability of projects. To make the energy transition inclusive and equitable, coordinated efforts are needed among businesses, European governments, and member countries, combining attention to the human dimension with the goal of closing skills gaps in the green sector.

Migration potential for the Italian and European energy transition: historical trends and new perspectives.

Luigi Campaniello

Dr. Campaniello's study (2025) analyzes the relationship between migration and the energy transition, with a focus on migrants' participation in *green jobs* in Italy and Europe. The survey starts with a historical analysis, which also defines a useful numerical dimension of the phenomenon, tracing Italian migration flows from the 1950s to the present, highlighting how policies and socioeconomic changes have progressively affected migrants' access to the job market. The Marshall Plan years, for example, favored the entry of low-skilled foreign workers, while in the 1990s increased flows and the introduction of more structured regulations formally improved access to work, but without resolving the phenomenon of *overeducation*, which remains a significant critical issue today. The survey combines historical and documentary methodologies with quantitative analysis of ISTAT, Eurostat and ILO data, integrating information on the national and European regulatory framework and *green* employment. The work shows how the presence of migrants in *green jobs* is growing but often concentrated in operational tasks with low skill recognition, especially for non-EU workers. In Italy, in 2023, migrants accounted for 22.6 % of those employed in *green jobs*, with a strong divide between Italians and foreigners: while the former cover specialized tasks, non-EU workers are mainly engaged in basic activities, with lower wages and higher work-related risks.

From a regulatory perspective, Italy's legislative evolution has sought to regulate entry and foster work inclusion, from the Foschi and Turco-Napolitano Laws to Decree Law 145/2024, but obstacles related to recognition of qualifications and professional certification remain. At the European level, integration models differ significantly between North, West, South and East, generating disparities in the participation of migrants in *green jobs*.

The energy transition sector and, in particular, the green hydrogen sector,

shows a growing demand for specialized skills: 75 % of the workforce is foreign, but only a quarter have formal certifications. Projections to 2030 estimate a 45 % increase in demand for foreign workers and a doubling of the need for green skills. To meet this challenge, the study suggests three strategic courses of action: drastically reduce the time it takes to recognize qualifications, establish targeted *up/re-skilling* pathways, and create a European green skills equivalency framework while ensuring anti-discrimination measures.
Campaniello's study shows how migrant employment in green jobs constitutes a structural component of the Italian and European energy transition. Failure to recognize competencies risks not only generating inefficiencies and inequalities but also slowing the diffusion of strategic technologies. Integrated policies of training, certification and inclusion are therefore essential levers for an efficient, safe and socially sustainable energy transition.

Migrants and agrivoltaics: an emerging sector.
Carla Ventre

In many Mediterranean countries, such as Italy, Spain and France, migrants already make up a significant share of the agricultural workforce; their involvement in agrivoltaic installations can enable them to meet the growing demand for skilled labor and develop strategic skills in the renewables sector. At the same time, job integration fosters social cohesion, the entrenchment of migrant communities in rural areas, and the creation of more inclusive local economies.
Dr. Ventre's work delves into a very vertical field: migrants' job placement in the agrivoltaic sector, which in itself poses a complex but strategically relevant challenge to combine environmental sustainability and social inclusion goals, especially for the agricultural world. The peculiarity of this sector – which integrates agricultural production and solar energy generation – requires a diverse, flexible, and skilled workforce capable of working in both agriculture and technical plant engineering. Migrant

workers often come from backgrounds with agricultural experience but are not always compatible with advanced photovoltaic technologies; this requires targeted *up-skilling* programs that combine traditional agricultural skills with knowledge of maintenance, electrical safety, and management of intelligent solar panel monitoring systems. To this end, initiatives such as TANIT in Italy and *capacity-building* programs in Germany are virtuous examples of integrated training, which include *workshops*, on-the-job internships, and labor law courses, key tools for fostering migrants' autonomy and employment stability.

Another relevant challenge concerns the management of working conditions and the protection of rights. Agribusiness, while an emerging and technologically advanced sector, is often developed in fragile rural settings, where migrant workers may be exposed to forms of job insecurity or exploitation. Ensuring social protection, job security and access to regular contracts therefore becomes an essential element in transforming inclusion into real and sustainable opportunity.

Finally, an innovative aspect concerns the use of digital tools and collaborative platforms to facilitate migrants' inclusion. Application management, training path planning and skills monitoring can benefit from digital systems that link institutions, companies and training providers, ensuring transparency, traceability and continuity of insertion pathways. Enercoop's experience in France with *mentoring* programs, language courses and vocational workshops shows that a structured strategy of integrated accompaniment significantly increases the likelihood of stable employment and autonomy for participants.

In summary, the agrivoltaics sector offers fertile ground for combining environmental sustainability, rural development and work inclusion of migrants, placing migrants not only as beneficiaries, but as key players in the green transition.

Lessons learned from the Netherlands: integrating migrants into the energy transition.

Angelique Witjes

Dr. Witjes' study analyzes the role of training programs and dual work-study pathways in preparing migrants with international protection for entry into the green job market in the Netherlands.
Through semi-structured interviews with business leaders and intermediary organizations (Stedin, Liander, Technical Valley, OOM, SEECE/HAN University), the research identifies effective integration strategies, highlighting how success depends not only on technical training, but also on targeted career guidance, ongoing mentoring, cultural sensitivity and strong employer involvement.
Some common elements of the key strategies identified emerged from the various interviews:

1. **Personalized preparation and career guidance:** structured onboarding programs include language training, cultural orientation and sectoral knowledge. The acquisition of soft professional skills, such as teamwork, hierarchy management, and personal presentation, is critical, as differences in educational systems and prior training paths can limit adaptation;
2. **Investment in language training:** intensive Dutch language courses, integrated into technical training, are a central pillar. Models such as those in Technical Valley, Stedin, and Liander combine theoretical and practical lessons with tutoring systems and innovative apps ("VaktaalApp") to support workers with limited literacy (Duiveman et al., 2025; De Bell et al., 2022);
3. **Employer involvement:** success depends on the active participation of businesses in the selection, onboarding, and mentoring of migrants, as well as the creation of concrete job opportunities. Matchmaking events, realistic entry profiles, and external coaching facilitate cultural and professional alignment between candidate

and company (Berenschot, 2021; Fontein & Gesink, 2025);

4. **Managing cultural differences:** the most effective integration programs include cross-cultural training for employers and teams, buddy systems, and external coaching, creating a safe environment for communication and cultural conflict resolution (International Organization for Migration, 2024; Bakker et al., 2021);
5. ***Skills passports* and skills recognition:** digital tools such as the "skills passport" enable the documentation of skills, soft skills, informal experiences, and personal motivations, improving access to employment and job mobility. Collaborative governance among firms, workers, and institutions is essential for standardization, personalization, and data sharing (Post et al., 2022; Van Genabeek et al., 2022; Ballafkih et al., 2022).

The study's focus on the Dutch case shows how the effective integration of migrants in the energy transition sector requires a combined approach: technical and language training, ongoing cultural and professional support, active employer involvement, and innovative tools for skills recognition. In this sense, therefore, the Dutch experience provides a replicable model for other European contexts, highlighting how social inclusion and green workforce development can be integrated.

Supporting refugees to overcome barriers to employment in *green skills*.

Sarah Walder for Talent Beyond Boundaries (TBB)

Following the focus on the Dutch case, TBB offers an interesting insight into the situation in the United Kingdom. As in other European countries, refugees and asylum seekers face numerous difficulties in socio-economic integration and particularly in accessing work in *green skills* sectors, amplified for refugee women. The most common barriers include legal status that limits access to employment or forces them into low-level positions, lack of established professional networks, discrimination, and difficulties in the recognition of qualifications obtained abroad. In the case of refugee women, gender barriers may include cultural stereotypes or local restrictions, which prevent them from putting their skills to full use.

TBB's research used the instrument of a survey conducted among a sample of individuals it follows and accompanies in job placement, administering a questionnaire to a small group that was highly profiled with respect to the research objectives.

To address these challenges, starting with the survey results Talent Beyond Boundaries proposes an integrated approach, based on a *Train-To-Hire* eco-system, in which multiple actors work together to facilitate the integration of refugees into the *green* job market. This model involves a combination of technical training, language support, *mentorship*, and direct involvement of employers. A concrete example involves **targeted training** and *upskilling* programs offered in third countries or online, which enable refugees to acquire green skills recognized in the UK. Courses on solar installation and maintenance, carbon footprint management, bioenergy, and hydrogen enable participants to arrive prepared for interviews and hiring. These programs can last from three to six months, with modular tracks that combine theory and practice.

In parallel, **intensive language support** is essential. Technical English

courses integrated into technical training, supported by *tutors or language buddies*, help refugees communicate effectively in the workplace and understand local procedures and regulations. For example, in a six-month pilot program, Syrian female refugees were able to attend English classes twice a week and hands-on sessions in the workshop, successfully completing the training and passing an interview with a British energy company.

Customized *mentorship* is another key element. Local instructors or professionals with similar experience accompany refugees, providing technical, cultural and practical support. This helps overcome initial difficulties, supporting inclusion in business dynamics and adaptation to new work systems.

One refugee electrical engineer recounted:
"My mentor helped me understand the company's internal procedures, get to know key people, and adapt to the work much faster than I could have done on my own."

Direct involvement of **employers** is essential. Companies participate from the beginning, setting realistic profiles and securing jobs through Train-To-Hire programs. Pilot experiences in Scotland have shown that highly skilled refugees can adapt quickly, bringing concrete benefits to the company, increasing colleague engagement and cultural diversity, and creating new perspectives on technical challenges.

Finally, overcoming bureaucratic and **legal barriers** is crucial. TBB works with the UK government, regulatory bodies, and local partners to simplify visa procedures, title validation, and international qualification transfers. Reducing the time and costs associated with immigration makes hiring more sustainable and attractive to companies. By combining technical and language training, mentorship, legal support, and active employer involvement, this integrated approach significantly increases refugees' chances of successfully entering the green skills

market, filling skills gaps and promoting social and economic inclusion. As one HR manager of a pilot company in Scotland points out, and TBB's research makes clear, "*investing in highly skilled refugees is not only an act of solidarity, but also a smart strategy to close the skills gap in the green sector.*"

Circular, Green and Inclusive Industrial Districts.
NeXt, Nuova Economia per Tutti (New Economy for All)

The work done by NeXt delves into the opportunities and functioning of Circular, *Green* and Inclusive Industrial Districts (ICGIs), which represent a model that can combine economic development, environmental and social sustainability through the articulation of five interdependent capitals.

- Cultural: includes shared practices, industrial history and local identity that foster a sense of belonging and active *stakeholder* participation;
- Human: covers the skills, training and technical and scientific *know-how* present in the area, an essential element for the development of *green* professions and continuous innovation;
- Social: includes the networks of trust, cooperative relationships and supporting institutions (clusters, business associations, third sector) that facilitate the coordination of actions and participatory *governance*;
- Environmental: measures the quality of ecosystems, the availability of natural resources, the presence of protected areas and the spread of infrastructure for renewable energy, pillars for the district's circularity;
- Economic: assesses the ability to generate value, attract investment and support shared infrastructure, also considering the level of eco-investment and opportunities for *green* products.

The most effective element of job market facilitation in ICGI Districts is vocational training, which is emphasized as an important tool for inclusion, and not only of migrants. People who attend training programs integrate more easily. In fact, training is also a tool for emancipation, comradery, dignity and participation, as well as helping to increase employment by reducing the gap between the skills required by companies and those possessed by migrants.

The Industrial Circular, *Green* and Inclusive Districts (ICGI) model offers a guideline for combining economic development, sustainability and social cohesion through five interdependent capitals: cultural, human, social, environmental and economic.

The research conducted as part of the Fondazione MAIRE - ETS call for proposals revealed three main findings:

1. Districts and well-being – a greater presence of districts is associated with higher values of economic and subjective well-being indicators (benessere economico e soggettivo) (BES), confirming the district as a lever of sustainable development;
2. Environmental weaknesses – the most productive districts suffer from worse environmental conditions, but the ICGI concept allows for the identification of priorities to improve ecological quality and competitiveness;
3. Inclusion and green skills - the presence of migrants has a positive correlation with the *concept*'s capitals, provided that paths of inclusion and training are activated, especially in the green skills that are most in demand and difficult to find today.

In conclusion, the ICGI *concept* is proposed as a model and operational tool for guiding policy, training and investment, transforming industrial districts not only into *clusters* of interaction between companies, as it was in the classic district model, but into bona fide laboratories of sustainable and inclusive innovation.

The migrants' point of view: expectations, barriers, and strategies in the process of work inclusion.
Fondazione AVSI - ETS

The research conducted by the AVSI Center for Community aims to analyze migrants' perspectives on training experiences and job placement opportunities in Italy, with a focus on emerging supply chains related to the energy transition. The survey, conducted between January 2024 and January 2025 through five *focus groups* and two semi-structured interviews with operators from partner institutions, involved 36 Arab, Hispanic and Ukrainian-speaking participants, with a majority of women, creating a rich and thought-provoking context. From the analysis, recurring barriers to entering the job market emerged: first and foremost, language, which is a structural obstacle. Something that was not obvious that surfaced is that even those individuals with functional skills in Italian or English perceive a sense of exclusion related to the language level required by employers. The mismatch between qualifications possessed and available job opportunities is another critical element: many migrants with advanced degrees or technical skills find themselves in low-skilled jobs, in contexts inconsistent with their background, resulting in de-skilling and dissatisfaction. Current training offerings, which are often generic, fragmented or poorly connected to the real needs of the job market, further limits the possibility of enhancing the prior skills possessed.
Despite these critical issues, the study highlights valuable elements: migrants show interest in *green* employment, curiosity and motivation to participate in training, with a willingness to contribute to the development of the territories in which they find themselves and, in the future, to bring the skills they have acquired back to their countries of origin. This willingness is accompanied by concrete strategies for overcoming difficulties: many participants resort to self-directed learning, online courses, informal networks among compatriots, and

participation in student training or *internships*, even in the absence of pay, to gain experience and increase employability.
Precise indications also emerge on how to make training provision truly effective. Training needs to be modular, flexible and professionalizing, with short pathways compatible with work and family commitments, and, again, supported by mentors or figures of reference to accompany migrants throughout the entire journey. For AVSI, too, the integrated pathway that combines technical training, vocational guidance, language support and real job opportunities is the only approach that will be able to create a virtuous circle.
In summary, the study shows that the job placement of migrants is not just a social issue, but a strategic lever for the sustainable growth of territories and emerging supply chains. Recognizing the potential of migrants, designing targeted training pathways connected to the job market and promoting concrete employment opportunities can transform fragility and marginality into valuable resources for the inclusive, innovative and resilient development of the productive and social system.

Conclusions

The analysis of the research contributions has revealed some common points for reflection, which can guide the next steps in terms of both method and concrete actions, to which the Fondazione MAIRE - ETS can give substance and concrete implementation.

- The intuition to look for connections between migration and the energy transition has proven to be solid and well supported by various findings that have emerged in different studies, not only in Italy but also in the Netherlands and the United Kingdom. Migrants can be a valuable resource for filling an employment *gap* in the energy transition, which is evident throughout the job market in Europe. However, job placement is neither natural nor simple: it requires an effort that is first and foremost cultural, then planning-related, and finally operational. Migrants themselves must participate in and be actors in this effort, explaining to them the opportunities and prospects that this path would offer and that they will not be alone in

facing the challenge. However, systemic barriers do exist and should not be dismissed (language, recognition of qualifications, contract precarity, housing policies, and gender discrimination) and must be removed and overcome with very specific actions at both the local public level as well as the private level (individual companies and, above all, the third sector);

- This challenge needs to be accompanied by more effective policies and tools, capable of combining targeted training, support for integration (social and housing), and the enhancement of professional skills. This means that neither an exclusively public nor a purely market-based model has worked, so an integrated approach is the winning and effective one. However, the integration of public policies and business actions raises the question of who can effectively design and implement such integration, in effect, draw up a whole new model;
- The role of third sector associations such as the Fondazione MAIRE - ETS and civil society organizations seems fundamental in this sense, widely recognized in publications and highlighted by the results of various studies that are part of this project. Indeed, associations act as a link between public intervention and foreign communities in various contexts, providing essential services to the migrant population, offering various activities aimed at improving the employability of refugees and asylum seekers, and supporting them in navigating both migration and employment policies.

National cases (UK, Italy, Netherlands) show that the incorporation of migrants into *green jobs* is possible and produces mutual benefits but requires structural interventions. The challenge is not only economic: it is a matter of social justice, equity, and overall sustainability.
Prospects for future research, particularly in innovative sectors such as agrivoltaics, reinforce the idea that the ecological transition cannot be separated from social inclusion processes. Integrating migrants and refugees into the *green economy* is not only a pragmatic necessity, but also a historic opportunity to build more resilient, inclusive, and sustainable societies.

FONDAZIONE MAIRE

THE STUDIES: PRESENTATION OF THE RESEARCH PROCESS

3.

3.1 What the literature tells us about the theme: text mining e topic modeling

Dr. Cecilia Fortunato

3.1.1 Abstract and scope of the research

This exploratory study aims to map the current state of scientific literature investigating the link between economic migration and the energy transition. Using mixed techniques of quantitative and qualitative analysis of text-based data, the study provides an overview of a collection of 3,731 documents published between 1990 and 2025. The transition to renewable energy presents several opportunities, but it is embedded in a complex economic, demographic, and social context with a structural shortage of workers. The migration of foreign workers has long been a crucial element of the Italian and European production system, as well as a phenomenon that generates change and innovation. However, the analysis reveals the vulnerability of foreign workers, various obstacles to their economic and social inclusion (legal, linguistic, cultural, gender, and qualification recognition), and a lack of attention by institutions in the areas of guidance, training, and mediation between labor supply and demand. An emerging line of research addresses the growing internationalization of the workforce specializing in “green and digital” jobs. However, specific studies on the link between foreign workers and the energy transition are still insufficient, particularly in policies and documents related to the Green Deal.

3.1.2 Methodology

With the overproduction and digitization of research, there is an increasingly urgent need for tools to synthesize, guide, and disseminate scientific output. This study proposes a theoretical framework and a 'mixed approach', both quantitative and qualitative, for the analysis of scientific literature on the topics of economic migration and energy[1] transition, published between 1990 and 2025 and indexed on Web of Science (WoS)[2]. For the systematic review of publications, an iterative procedure of inclusion/exclusion was applied to a collection of documents, which were then subjected to bibliometric and thematic[3] analysis. The bibliometric analysis of the metadata associated with the publications reveals the geographical and temporal evolution of the research, the forms of funding, the most active authors and publishers, and the extension of the research networks. The systematic analysis of a body of texts, in this case the abstracts of the publications, requires an extensive preparation[4] process. Elements that do not add semantic value to the analysis (symbols, punctuation, stop words) are removed from the text; tokenization techniques, which divide a text into meaningful units (tokens), and lemmatization techniques, which reduce words to their basic form, are applied.

Based on their frequency, *tokens* are sorted into a matrix[5] that assigns them a weighted value, taking into account that words that appear more frequently may be un-informative. Probabilistic models[6] identify the latent structures of the text and provide a summary of the *main topics* covered, highlighting areas of relevant research and emerging trends.

Concluding the study, a qualitative analysis of the content[7] of a limited selection of publications is proposed, which explore the link between foreign workers and their inclusion in the green economy sectors.

[1]For publication purposes, the following pages provide a brief summary of the results obtained with the different approaches. The study's data, methods, and results are available upon request.
[2]Web of Science Core Collection, All Editions, search by 'Topic'.. Last accessed: July 3, 2025.
[3]Pisarevskaya et al., 2020; Aria & Cuccurullo, 2018; Farren, 2019; Snyder, 2019; Belter, 2020; Denyer & Tranfield, 2009.
[4]R packages: tidytext, dplyr, ggrepel, ldatuning, topicmodels, bibliometrix.
[5]Term Frequency–Inverse Document Frequency (TF-IDF) (Aria & Cuccurullo, 2018).
[6]Latent Dirichlet Allocation model (LDA) (Pisarevskaya et al., 2021; Farren, 2019).
[7]Kuckartz (2019); Schreier (2013).

3.1.3 Description of the research and main findings

Sustainability goals and strategies for pursuing them are among the most debated issues of our time. Europe, particularly the Mediterranean area, has multiple vulnerabilities in terms of environmental risk, many of which have been exacerbated by the recent acceleration of climate change. Extreme weather events, drought, and hydrogeological instability are just some of the emergencies that the international community and local governances are facing. In addition, the rise in global temperatures projected for the coming decades will exacerbate existing critical issues and increase the number of areas at risk[8]. The timely implementation of strategies to mitigate these processes is essential. European and global policies for an ecological transition of the economy[9] aim to mitigate the impact of climate change resulting from human activity. European economies are arduously pursuing projects of environmental, social, and economic sustainability, shifting from the intensive exploitation of fossil fuels to renewable energy sources (solar, wind, geothermal, hydroelectric, hydrogen, biomass). From an economic standpoint, these productive transformations and a green entrepreneurial orientation mechanism can promote the rational allocation of local resources, effectively increase opportunities, long-term success, and the economic and social resilience of the communities involved. A growing job market is involved in the design, construction, and maintenance of these clean energy projects. However, this transformation must take into account existing economic and social contexts and the considerable demographic changes underway. Consistently low fertility rates, rapid increase in population age, welfare systems at risk, depopulation of inland areas, and a shrinking workforce are demographic challenges common to almost all EU countries.

In Italy, these dynamics have taken on a structural dimension that is difficult to reverse.

In this context, immigration has become increasingly significant over the last forty years and has gradually stabilized since the 2000s, mitigating demographic imbalances and contributing to the transformation of the country into an increasingly multi-ethnic society. As of January 1, 2025, there were 5.4 million foreigners legally residing in Italy, accounting for 8.9% of the total population[10]. As a result of the progressive integration of immigrants into the country, in recent years there has been a substantial increase in the number of residence permits related to family reunification (more than 100,000 applications approved each year since 2011) and a sharp increase in the number of people acquiring citizenship (684,000 new Italian citizens registered between 2020 and 2025) (Istat). Moreover, over the last ten years, a significant increase in the arrival of people seeking international protection has followed the global growth of climate and geopolitical crises. The 2.5 million foreign workers residing in Italy, constituting about the 10.5% of the regular workforce, constitute an integral part of the productive system, a vital resource not only supporting the labor supply and the welfare system, but also providing human capital, being a source of diversity and innovation. The so-called “immigration GDP”, or the economic contribution of foreigners to national wealth, is estimated to be €164.2 billion per year, equal to 8.8% of the national GDP (Fondazione Leone Moressa, 2024). The economic sectors where the presence of foreign workers is very high

[8]World Meteorological Organization, 2025

[9]From the 1997 Kyoto Protocol to the 2012 Doha Amendments, from the 2014 2030 Climate and Energy Framework to the 2015 Paris Agreement, up to the European Green Deal launched in 2019.

[10]Istat data.

are agriculture, construction, manufacturing, domestic and personal care services, catering and tourism, logistics, and transport. The fundamental role of immigration in the country's production system is well known, especially in high-manual and lower-paid employment sectors. The Ministry of Labor and Social Policy (2025) estimates a need for approximately 640,000 immigrant workers for the period 2024-2028. Yet, admissions for work purposes, regulated annually by the Flows' Decree, have steadily declined over the years (from approximately 140,000 permits issued in 2011 to just under 40,000 issued in 2023[11]). This data is accompanied by the limited success of EU and national instruments to encourage skilled migration flows, such as the EU Blue Card[12] program12 or the national Skilled Immigration Act (Germany) and Invest your Talent in Italy programs, established with the aim of attracting "talent" from non-EU countries.

A vast body of scientific literature examines the job placement of foreigners in the labor markets of destination countries.

However, studies on how the foreign workforce can assist the green transition in various sectors are virtually non-existent. The research strategy was therefore extended to the broader topics of employment in the green economy sectors and the job placement of migrants in the Italian and international markets.
The research questions posed by this study are:

1. What are the employment dynamics in the traditional and emerging sectors of the energy transition?
2. What are the dynamics of the integration of foreign workers into the job markets of destination countries, particularly in the Italian context and in the sectors involved in the energy transition?

Using an iterative procedure that follows predefined inclusion/exclusion criteria, publications were selected from the Web of Science archive to construct three distinct datasets (**Table 1**), which were then analyzed using both automated and qualitative techniques. This report briefly illustrates some of the results that emerged from the systematic literature review (SLR) of the two datasets EMP_ET and MIG_EMP.

[11]Istat (2023). Report on Non EU Citizens in Italy. Available at: www.istat.it/wp-content/uploads/2024/10/REPORT-CITTADINI-NON-COMUNITARI_Anno-2023.pdf
[12]Directive 2009/50/EC and Directive (EU) 2021/1883

Table 1:
Description of datasets and the different *screening* phases

Dataset	Description	Documents collected Query with keywords	First automated screening	Second screening Exclusion by keywords	Third Qualitative Screening	Methods
EMP_ET[13]	Studies on employment and energy transition	2.571	2.036	1.532	-	SLR
MIG_EMP[14]	Studies on the integration of migrants into the workforce	22.255	15.897	2.077	-	SLR
MIG_ET[15]	Studies on migration and energy transition	1.121	282	122	32	QCA

Note: SLR: Systematic Literature Review (Aria & Cuccurullo, 2018); QCA: Qualitative Content Analysis (Kuckartz, 2019).

Systematic review of EMP_ET: employment in the energy transition sectors

Starting from the first dataset (EMP_ET), a systematic review of the literature exploring the link between employment and energy transition was applied, identified in this study from a collection of 2,571 scientific articles, mostly in English. Research on employment in green jobs has grown steadily in recent years, focusing on the workforce, the job market, skills, and efficiency. Events such as the Covid-19 pandemic in 2020 and the energy crisis triggered by international instability in 2022 have significantly accelerated interest in renewable energy, with 82% of the documents collected being published between 2020 and 2025. The countries most involved in scientific production on the subject[16] are China (423 documents), the United States (388), England (320), Italy (219), and Germany (216). A cross-analysis of the most active journals, the relevant disciplinary fields, and the stated sustainability goals of the 2030 Agenda (SDGs)[17] reveals a lack of humanistic and social perspectives on the topic. In fact, 99% of publishers' research areas are related to energy and environmental sciences. In terms of research impact, researchers have framed their work within the pursuit of the SDGs “Climate Action”, “Affordable and Clean Energy”, and “Industry, Innovation, and Infrastructure”. On the other hand, goals with a more social matrix, such as those related to poverty reduction, full and productive employment and decent work, and the reduction of inequalities, are neglected. Demonstrating the importance of these issues, the three studies[18] with the highest number of citations[19] instead examine social justice and

[13] Query on WoS: TS = (workforce OR labor OR employment OR jobs OR skills OR training OR "human capital" OR "human resources" OR "green jobs" OR "green skills") AND ("green transition" OR "green economy" OR "green deal" OR "energy transition" OR "climate transition" OR decarbonization). Last access: July 2025.

[14] Query on WoS: TS = (migrant OR refugee) AND ("labor market integration" OR "labor market inclusion" OR "economic integration" OR employment OR entrepreneurship).** Last access: July 2025.

[15] Query on WoS: TS = (migrant OR refugee OR "irregular migrant" OR "asylum seekers") AND ("green deal" OR "green energy" OR "green sector" OR "energy transition").**Last access: July 2025.

[16] Obtained from the country of affiliation of the first author.

[17] The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, sets out 17 Sustainable Development Goals (SDGs) to be achieved by 2023. /sdgs.un.org/goals.

[18] Carley, S., & Konisky, D. M. (2020). *The justice and equity implications of the clean energy transition*. Nature Energy (760 citations). Rizos, V., Behrens, A., van der Gaast, W., Hofman, E., Ioannou, A., Kafyeke, T., Flamos, A., Rinaldi, R., Papadelis, S., Hirschnitz-Garbers, M., & Topi, C. (2016). *Implementation of Circular Economy Business Models by Small and Medium-Sized Enterprises (SMEs): Barriers and Enablers*. Sustainability (647 citations). Zhang, D. Y., Mohsin, M., Rasheed, A. K., Chang, Y., & Taghizadeh-Hesary, F. (2021). *Public spending and green economic growth in the BRI region: Mediating role of green finance*. Energy Policy (540 citations) region: Mediating role of green finance. Energy Policy (540 cit.).

equity, the circular economy, public intervention, and the role of politics and finance in the implementation of energy transition projects.

An analysis of the keywords proposed by the authors of the studies allows us to outline some features of the production systems involved in the energy transition. The most studied sectors are those of off-grid renewable energy sources (RES), in particular solar, wind, hydroelectric, and marine energy. At the industrial level, energy-intensive sectors such as electric vehicle manufacturing and industries of raw materials related to renewable energy (cobalt, lithium, rare earth metals) are strategic. Vulnerable areas and islands are identified as key locations for the implementation of energy transition pathways, offering important natural resources and the opportunity to address environmental degradation and depopulation trends at the same time. From global agri-food value chains to local organic farms, the agricultural sector is heavily involved in the development of green technologies and is particularly significant in terms of employment dynamics. Strategies to mitigate rural decline are often associated with increased immigration. Several studies show how the role of migration is crucial in this area, especially in a direct way, due to the large prevalence of foreign workers in this sector, but also indirectly, due to the potential transfer of knowledge on traditional and innovative technologies for resilient and sustainable agriculture. A renewable energy market with growing economic and employment opportunities and a potential "multiplier effect" on local communities and businesses is what links the green transition to the digital transition. One example is the creation of advanced technologies for the energy systems of so-called "smart villages". Another rapidly expanding sector is the 'Web Economy', where information and communication technologies (ICT), often concentrated in a few regions, are attempting alternative ways to reduce the consumption of huge amounts of energy to meet data processing and storage needs.

In general, although several studies highlight the potential creation of "millions of jobs," the issue of employment is not treated as a driving force behind the transition, but rather as an indirect effect.

The sectors most oriented toward renewable energy and new sustainability strategies experience a shortage of skilled workers for the implementation, maintenance, and management of infrastructure. The most in-demand professional profiles are civil engineers, network engineers, artificial intelligence engineers, and IT specialists, but also security personnel, maintenance technicians, and personnel employed in the economic activities that the green industry can generate in other productive sectors. These roles are identified as stable, require technical skills, and offer competitive salaries. Finally, a very small proportion of documents (just under 4%) explore the quality of work, labor rights and standards, health coverage, and welfare associated with the green economy.

[19] The number of citations is commonly used in bibliometric analyses as an indicator of research impact. Although it is not exempt from criticism (see the DORA Agreement, ratified in San Francisco in 2012), it remains a widely adopted measure reflecting the interest and recognition of the scientific community toward a published study.

Systematic review of MIG_EMP: the integration of foreigners into the job market

Since the 1990s, the integration of foreign workers into European job markets has attracted a growing number of cross-national case studies and analyses, highlighting various critical issues and forms of vulnerability of this component of the workforce. For this study, 2,077 documents published between 1992 and 2025 were analyzed through a systematic review, with an acceleration in scientific production recorded following the global economic crisis (2008-2011) and the humanitarian crisis on the southern shore of the Mediterranean (2015-2017). The countries with the highest scientific output are England (303 publications), the US (280), China (273), Germany (237), the Netherlands (127), and Italy (107). The disciplines most interested in the topic[20] are Economics (821 publications), Demography (398), Sociology (207), Ethnicity Studies (160), and Geography (157). For this collection, the most frequently mentioned SDGs are the "Reduction of inequalities", the "Abolition of poverty", and "Gender equality". The analysis of keywords indicates that migrants' success in the labor market of the destination country partly reflects their skills, networks, human and social capital, adaptability, and entrepreneurial spirit.

Keyword analysis indicates that the success of migrants in the job market of their destination country partly reflects their skills, networks, human and social capital, adaptability, and resourcefulness. However, career trajectories are strongly influenced by the legal, institutional, and social context in which they operate. Full economic integration takes time, on average, between 5 and 10 years according to several studies. Both the legal status of entry and the (multiple) status changes that migrants experience over the course of their lives have important repercussions on the length of their stay in the host country and on their path to economic and social integration. Furthermore, several studies show that foreign workers are often confined to the lowest levels of the occupational hierarchy, to discriminatory practices of "ethnicization" of labor, and to a widespread underground economy. The objective fragility of the foreign workforce can be measured in terms of income (with almost 25% of foreign workers at risk of poverty in Italy), precariousness (with a prevalence of short-term and seasonal contracts), segregation (in occupational niches), under-employment, and fewer opportunities for professional upward mobility and access to skilled jobs. Regular migrants with medium-high levels of education, beyond the linguistic and cultural barriers they may encounter in the workplace, often face difficulties in the conversion of their educational backgrounds and qualifications obtained in their countries of origin, and in the recognition of their skills and the human capital they own. As a result, the job positions and salaries they can access are not in line with their background and expectations. In this context, as for native workers, the most vulnerable groups such as women and young people are at a greater disadvantage. In addition, poor awareness of protection mechanisms, inadequate housing conditions, and distance from the workplace are some of the factors that make foreign workers more vulnerable to exploitation and exclusion from the legitimate job market. The difficulty of access to the job market for asylum seekers is also well documented, linked to legal, occupational, and residential

[20] Obtained from the Research Categories assigned to the journal by Web of Science.

restrictions deriving from the international protection regime. Finally, migrants are the component of the workforce most exposed to market fluctuations, macroeconomic shocks, and global crises. Some examples are the employment crisis in the Gulf countries caused by the collapse of oil prices in 2014, the war between Russia and Ukraine and the resulting blockages of seasonal workers, the closure of borders in 2020 due to the Covid-19 pandemic, and the negative effects on mobility and employment sectors. Obstacles to participation in the formal economy are in turn associated with limited involvement in the community; unfamiliarity with democratic institutions, public decision-making processes, and one's rights as a citizen; a lack of social capital, trust, and sense of belonging; and less environmental and entrepreneurial engagement.

3.1.4 Conclusions

Research must provide tools for analyses that are essential for the definition of effective policies. This study is part of the broader debate on how socially inclusive and technically feasible solutions can promote just energy transitions, i.e., just, inclusive, and socially responsible. A first observation is that the dynamics of the green transition vary considerably depending on the context and are correlated with other economic, political, and demographic settings. It is therefore necessary to rethink the governance and regulatory strategies for the energy transition, outlining homogeneous development of projects across the territory that considers local specificities and guarantees flexible labor regulations as well as forms of mitigation and economic diversification. In addition to promoting public understanding of green energy and environmental protection measures, the public sector should regulate and articulate the country's energy transition path in a series of strategic points, for example by offering training and employment services aimed at orienting and aligning skills and qualifications in green jobs with labor supply and demand. The migration of foreign workers has long been a structural element of the Italian and European production system. Job placement in green sectors is part of the broader dynamics of economic and social integration of migrants. There seems to be a need to take a holistic view of the issue, capable of implementing solutions that can address the complexity of migration and economic processes. Migration policies should take greater account of the supply and demand for foreign workers, including in green sectors, and facilitate legal entry routes. Adequate and timely planning of labor migration flows must be followed with a guarantee of economic security, work inclusion, and social protection for migrants. Recruitment of a diverse workforce also requires ongoing training plans for the managerial class, corporate leadership, and the workforce itself, pathways to overcome language and cultural barriers, and greater consideration of the human capital of foreign workers. In this regard, the key role of civil society organizations as providers of essential services to the migrant population is widely recognized in the literature, offering various activities aimed at improving the employability of refugees and asylum seekers and helping them navigate migration and employment policies.

3.1.5 Biography

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She holds a degree in Political Science and International Relations, specializing in Cooperation and Development, and a PhD in Demography from the School of Statistical Sciences at Sapienza. Her research interests center on international migration and the integration processes of migrant and diasporic communities. In particular, she focuses on voluntary and forced migration aspirations and behaviors, as well as emerging aspects of migration, such as return migration and the increasing flows of climate and environmental migration. She pays particular attention to the paths of integration, job placement, and economic and social inclusion of foreigners; to policies, narratives, and public debate on migration issues; to perceptions, subjective well-being, and the transfer of foreigners' cultural heritage to the contexts of their destination. In her studies, she adopts a multi-method and interdisciplinary approach, using quantitative and qualitative tools ranging from the text analysis of literature, media, and social media to the analysis of census or survey data and the use of ethnographic tools such as qualitative interviews and focus groups.

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3.2 Employment and training of migrant workers in the energy transition: what is really happenin

Dr. Antonio Umberto Mosetti

3.2.1 Abstract and scope of the research

This contribution offers a qualitative perspective on the current state of employment of migrant workers in the energy transition. Focusing on concrete realities, it draws attention to the emerging development of the interface between migrant workers, green sector companies, and institutional bodies. The paper therefore considers the growing number of attempts to make work in the green sector attractive to migrant workers and, at the same time, to make their employment functional for business projects. This *paper* studies the state of the art of institutional thinking in the economic, legal, and social fields on the opportunities and challenges of combining energy transition and the employment of migrant labor. It contributes to research on the difficulties of formalizing work, recognizing skills in different countries, and the long-term perspective of job training. Finally, it focuses on direct experiences of training, mobility, and employment of migrant workers in projects of companies involved in the green transition, in order to provide a concrete perspective on the progress and replicability of current practices and frameworks and to offer a vision of the future of the sector, without forgetting the ethical implications of migration and integration policies.

3.2.2 Methodology

The work consists of a documentary analysis of scientific literature and policy papers, discussions with experts in the field, and the study of two projects. The research started from the concept of mutual legibility, with the aim of exploring any gaps in understanding between the interests of the various stakeholders in the energy transition: states, businesses, workers, and, specifically, migrant workers. It was then developed by investigating the interests and concerns of players currently active in the green transition, gathering information from a review of scientific literature, policy papers (ICMPD; EU; ILO; OECD) and proceedings of ongoing institutional projects. The literature review was accompanied by interviews with professionals in the field, representative of best practices in terms of legal procedures and multilateral project planning. The analysis is completed by a comparison between scientific and practical reflections and protocols implemented in two different Skill Mobility Partnership projects. In this way, the contribution was able to observe the real state of scientific discourse and project activity in the energy transition, identifying current challenges and cutting-edge solutions.

3.2.3 Description of the research and main findings

Introduction

The socio-demographic and employment effects of the energy transition have generated great employment potential for migrant workers in the green sector in Europe[1]. This paper investigates the actual employment and training of migrant workers in the energy transition sector, focusing on critical issues related to the recognition of skills and management of training courses. Despite already playing a critical role in various areas of the green sector, the employment of migrant workers suffers from a lack of uniform standards and therefore the difficulty of predicting long-term professional development. This research therefore aims to outline the prospects of the energy transition from an inclusive and equitable perspective for the workers themselves.

Migrant workers and skills for the energy transition

The energy transition is reshaping the job market and will shift workers from fossil fuel-related industries to those working with renewable energy. In its forecasts for the European Green Deal, the European Union (EU) has considered a scenario in which the goal of climate neutrality in 2050 would create 2.5 million jobs[2]. However, the demand for labor in the green economy is not matched by the availability of specific skills and capabilities. This slows down the potential for innovation and the adoption of new technologies, as well as the ability of companies to invest and be productive in the green sector.

A large proportion of migrant workers already present in EU countries are in fact employed in sectors that are crucial for the energy transition (e.g., construction, logistics, IT). This gives rise to the prospect of drawing on the labor of potential migrant workers to fill labor shortages in EU countries.

[1] Similar considerations apply to the United States of America; this article is limited to describing the situation in detail

[2] CEDEFOP, 2021.

Building skills for the energy transition

Skills Mobility Partnerships (SMP) are multilateral agreements that combine worker training and job mobility in destination countries to address labor and/or skills shortages. In the *green* sector, they have the capacity to support the energy transition in different countries by promoting the activation of a latent workforce.

The ILO (*International Labour Organisation*) emphasizes that all professions can become greener, and even jobs that require entry-level skills are often crucial for the green transition. It is therefore essential to reflect not only upon the transfer of skills but also upon defining and training the very skills needed for the energy transition. Skill recognition is central to the ability of migrant workers to participate in and benefit from employment in the energy transition. The lack of inter-operability between certification systems in different countries is a challenge in multilateral projects, and the harmonization of standards is one of the most important factors in ensuring the attractiveness of the green sector to migrant workers, their availability, and their long-term employment.

Training is therefore a crucial axis on which to analyze the energy transition and policies that can make it inclusive. The Center for Global Development (CGD)'s *Linking Training and Migration for the Green Transition* project offers an example of training that is integrated with migration policies, also involving the governments of the countries of origin to facilitate the return, transfer, and enhancement of skills, thus offering long-term guarantees for workers. Equally important are forms of compensation and restitution to countries that invest in training workers who will then contribute to other economies. Alongside institutional players, the receptive role of local entities is fundamental, and therefore the involvement of SMEs and cooperatives active in the green sector. A final key issue concerns the quality and transferability of skills, which is investigated in the next section through two case studies on SMP projects.

Case studies: SDM4EU and NET-Work You

The SDM4EU and NET-Work You projects address, with different approaches, the challenges of readability, transferability, and lasting recognition of the skills acquired by migrant workers in the context of the energy transition. They are experiments in multilateral recognition models between European and non-European players. They reflect the need to build common frameworks between countries of origin and destination, and between institutional and non-institutional actors, to ensure that the skills acquired can contribute at multiple levels.

SDM4EU
Skilled Driver Mobility for Europe

The SDM4EU (*Skilled Driver Mobility for Europe*) project is an example of organized mobility related to low-skilled services, which is interesting for skills recognition processes. Active from June 2024 to December 2024, it focused on transparency of employment conditions and institutional trust. Cooperation between different European and non-European actors has made it possible to create shared standards for assessment and training. Promoted by the International Centre for Migration Policy Development (ICMPD) and IRU (World Road Transport Organization), the project involved 18 European and non-European countries to facilitate the training of

drivers and their subsequent mobility as skilled workers, responding to the labor shortage in the transport sector. It is an example of the feasibility of adopting shared standards in training courses, skills assessment, and the definition of employment conditions.
The project identified potential obstacles to the mobility of migrant workers in the European Union: significant regulatory inconsistency and differing needs among countries, and non-compliant standards for the recognition of skills. Although the project did not establish a formal certification scheme, it laid out the groundwork for resolving this impasse and unifying standards across countries, with a framework aimed at training and certifying skills through harmonized procedures. SDM4EU is an interesting experiment in building shared standards through the coordination of different actors (ICMPD and MPF; EU and non-EU governments; training professionals; logistics companies; trade unions) and their needs.
SDM4EU should therefore be taken as an example of best practice, both in its efforts to harmonize standards for work certifications, which are important actions for resolving one of the main issues for job mobility in the EU and for building replicable models on a larger scale, and in its multilateral involvement, effective implementation of the previous point, as well as a way of ensuring just employment conditions. The long-term results of the project (duration of employment and robustness of certifications in the future) are yet to be seen and are a potential concern given the short duration of the project. Furthermore, despite the involvement of various actors, SDM4EU does not include measures for the reintegration of workers in their countries of origin considering the skills acquired, demonstrating a potential flaw from the perspective of circularity.

NET-Work You: *Creation of a Skills Network to Increase Employment Opportunities for Young Egyptians in the Green Job Sector*

Launched in April 2024, the NET-Work You project focuses primarily on the agricultural sector and is characterized by its integrated approach to training, combining technical skills in agriculture with language, digital, and soft skills. The project, the result of an agreement between Italy and Egypt and active until September 2027, aims to train 150 young Egyptians for jobs in the green sector. Its goal is to bring 100 potential workers to Puglia for a three-month internship with companies that are part of *Confcooperative Puglia* and already active in the green sector.

NET-Work You should also be taken as an example of best practice, first and foremost in terms of its focus on the circularity of job training. In fact, after their internship in Italy, the workers will continue their training by putting the skills they have acquired into practice in the Egyptian job market, thus opening the door to potentially long-term employment in both countries. The goal of long-term employability is also supported by a large 'Mediterranean' network of stakeholders, a potential pool for the recruitment of workers trained in the project. In addition, the project aims to build a replicable model for skills recognition, working on the creation of a common language among workers, businesses, and policy makers, laying out the foundations for bilateral institutional dialogue.
This last point is critical and will certainly be crucial in evaluating the project upon its completion in 2027. While the certification framework is being prepared by various partners, it should be noted that it still needs to be aligned with national certification systems, and with European standards. Obviously, this would facilitate the long-term employment

of workers, even in different countries; the difficulty in reaching institutionally shared standards underscores the central importance of further efforts towards common and harmonized regulations.

3.2.4 Conclusions

The energy transition undoubtedly represents an opportunity for many migrant workers, and inversely, the migrant workforce can fill a labor shortage in Europe. Analysis of training and employment projects for migrant workers in the *green* sector has shown that the definition and multilateral recognition of skills is the main concern of cutting-edge project practices. The best practices suggested by the processes analyzed are:

1. Training for migrant workers that includes not only technical skills, but also language, digital, and interpersonal skills;
2. Involvement of various actors (public institutions, businesses, trade unions, international organizations) to facilitate integration into different job markets and to build common standards for job skills;
3. Concrete experience with job mobility and reintegration into the home country's job market to ensure the employability of workers in different contexts.

Examples of cutting-edge SMP projects, SDM4EU and NET-Work You, have nevertheless highlighted that the world of energy transition must work on harmonizing job qualifications between different countries, including within the EU. This issue is crucial to making training and employment projects scalable and sustainable over time and needs to be addressed through serious discussion among business leaders, European institutions, and individual Member States, given the importance of migrant workers for the energy transition and the European Union's *green* shift. In conclusion, it is important to highlight the critical issues surrounding migration policies that make a migrant's entry into a country conditional on their work productivity. States and companies interested in the mobility, training, and employment of migrant workers in the energy transition must support broader and more sustainable integration processes that consider he human dimension together with the labor dimension as well.

3.2.5 Biography

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Mr. Mosetti holds a bachelor's and master's degree in Anthropology, obtained in 2020 and 2023 respectively from Sapienza University of Rome. In 2021, he obtained a *Master of Philosophy in Development Studies* from the University of Cambridge. He is currently pursuing a PhD in History, Anthropology, and Religions as well as African Studies, with a joint supervision agreement between Sapienza University of Rome and Ghent University. He focuses on issues related to food and market economies, with particular attention to the materiality of food and the role of social and physical infrastructure in shaping agri-food supply chains. He conducts research in the Arusha Region of Tanzania, and from 2022 to 2023 he worked with the Barikamà Social Cooperative, founded in Rome in 2011 by West African workers who carry out organic farming activities in the Roman countryside.

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3.3 Migration potential for the Italian and European energy transition: old and new trends

Dr. Luigi Campaniello

3.3.1 Abstract and scope of the research

This study analyzes the relationship between the energy transition and migration in Italy and Europe from a historical and analytical perspective. To analyze the current employability of migrants in *green jobs*, it was deemed useful to go back to the 1950s when, with the Marshall Plan, the socioeconomic context for welcoming the first immigrants to Italy was redefined. The improvement in living conditions had a twofold effect, evident in the dichotomy between natives and immigrants, progressively favoring the former at the expense of the latter in the following decades. In the 1990s, the disproportionate increase in migratory flows forced the country to redefine its policies on the matter by establishing an actual regulatory apparatus. This made it easier for migrants to access work but did not solve the problem; on the contrary, it created a new one: *overeducation*. In this regard, the research addresses the evolution of the issue until the present day through comparative data analysis and by showing demographic correlations that offer an initial schematic interpretation of the relationship between immigrants and the energy transition (green jobs) in Italy and Europe.

3.3.2 Methodology

The survey follows a mixed approach, combining historical-documentary analysis, surveys, and state and comparative quantitative sociodemographic and economic analyses. Primary sources include Marshall Plan documents, various immigration flow decrees, and European and Italian immigration regulations from the earliest days to the present, contextualized with *ad hoc* data analysis and annual reports. On the quantitative side, ISTAT and ILO series and Eurostat data were used to derive demographic indicators, percentages of foreigners of working age, and evolutionary balances. At the same time, the documentary analysis of mere job employment and specific employment in *green jobs* provided a broad overview of the current situation in Italy, including internal regional disparities. The analysis of data on territorial inequalities in migration and green employment provides a clear picture, despite all the complexities involved, showing how, at the regional level, these inequalities weigh heavily on both fronts and suggesting a more regional than national interpretation. The same applies if the scope of the analysis is broadened to consider the European Union and Member States, where *outliers* (extreme data points) dominate the analysis.

3.3.3 Description of the research and main findings

The Economic-Demographic and Energy Context

In the 1950s, the Marshall Plan doubled Italy's GDP growth, albeit with significant differences between North and South, affecting the conversion of Italy from a country of emigrants to one of immigrants. The first foreigners, employed in factories in the North and in agriculture in the South, occupied low-skilled jobs, filling the employment gap left by Italians, who were no longer willing to take on low-skilled roles.

This trend continued until the 1990s, a decade that marked a turning point in many respects. Migration flows increased exponentially (+316.7% in 10 years), shifting from solitary, work-related immigration to a more family-oriented one. Immigration was regulated by more robust laws that legally divided migrants according to their purpose, length of stay, and most suitable paths to inclusion, distinguishing, among others, economic migrants from refugees, etc. This facilitated migrants' access to the job market without, however, solving the main problem: *overeducation*.

Performing a job that is far below one's skills became a major administrative and work-related obstacle for immigrants. In the early 2000s, in fact, 41% (+7% EU average) of foreign workers in Italy were overeducated, compared to 19% of native workers. Among employed foreign graduates, 17.7% had unskilled jobs. This becomes even more dramatic when we consider the *green jobs* linked to the energy transition, which require quite specialized skills that are almost never recognized in immigrants.

In Italy, 'green' professions account for less than 20% of total employment if we adopt a broad definition based on the O*NET binary indicator, or 5% if we use a more restrictive indicator such as Vona's.

Regulatory developments, policy framework and immigration management

The evolution of migration legislation reflects dynamics within migrant work inclusion, most notably today in *green jobs* linked to the energy transition.

The Foschi Law (943/1986) was the first comprehensive legislative intervention. It introduced work permits based on lists, establishing formal but not substantive equality between Italian and foreign workers. The Turco-Napolitano Law (1998) established entry quotas based on job market needs, allowing for seasonal work or job seeking. The sharp increase in foreign residents and arrivals in 2000 led the Berlusconi II government to adopt a more restrictive approach with the Bossi-Fini Law, which established an inseparable link between residence and work, making migrant workers vulnerable to exploitation. Finally, Decree Law 145/2024 facilitated entry for work and extended quotas but neglected channels for job hunting and the legalization of immigrants already present.

In Europe, the United Kingdom, Ireland, and Sweden decided to immediately liberalize their job markets for citizens of the new Member States, while others, such as Germany and Austria, maintained transitional restrictions until 2011. This asynchrony led to a *diversion effect* of migration flows towards the more open countries. Croatia, Luxembourg, Malta, and Slovakia show higher employment rates for foreigners than for natives, suggesting greater work inclusion. While the European Union is moving towards the work inclusion of migrants in green jobs (POWGEN[1] is an example), it is also true that countries differ greatly among themselves. Denmark, Luxembourg, and the Netherlands provide for full qualification recognition and targeted job placement in their regulations and state programs, demonstrating a model that can also be applied in southern European countries, which are experiencing a shortage of labor in even highly specialized sectors.

Migration paradigm shift: an Italian statistical perspective

In the 1980s and 1990s, with the introduction of the first laws and amnesties, around 200,000 foreigners were regularized. The migrant profile at the time was largely made up of non-EU workers (Middle East, North Africa) and emergency migrants (Albanians and refugees from the Balkans), mostly employed in agriculture, construction, and domestic services. However, family migration was on the rise, with reunifications already accounting for 40% of new arrivals.

Statistically speaking, from 1981 to 2001, the foreign population in Italy quadrupled from 321,000 to 1,330,000, with an annual growth rate of around 15%, but remaining well below the European average. In the 2000s, demographic dynamics made immigration the main factor in population growth (the natural balance has been consistently negatived since 1993). Numbers and percentages: as of January 1, 2024, there were approximately 5.3 million legally resident foreigners (8.9% of the population). The average profile of migrants today is younger with more women than in the past. In 2021, 53.3% of foreigners in Italy were women (a particularly high proportion among Ukrainians and Filipinos), while the average age is low (more than 75% are under 50). The prevailing nationality has changed: today, the largest groups are Romanians, Albanians, and Moroccans. Over half moved for work reasons

[1] POWGEN is a European project (funded by the European Commission's AMIF-2023 programme) that aims to identify and analyse successful initiatives for labour inclusion in Europe, focusing on third-country nationals (TCNs), particularly women. It focuses on three pillars: migration, training, and the renewable energy and renovation sectors, with the aim of placing migrants in roles that contribute to their growth and the green transition. Italy is a partner country in the POWGEN project, with the participation of C.I.D.I.S. and the Campania Region.

(56.3%), and 40.3% for family reunification. Foreigners make up about 10.8% of the national workforce and 10.4% of the employed (relatively increasing since the 1990s if one considers the aging of the Italian population and therefore the ratio between Italians and foreigners).

European and comparative migration profile

The EU currently has approximately 62.6 million foreign residents (44.7 million born outside the EU + 17.9 million born in another EU country). The main countries of destination are Germany (17.8 million), Spain (11.1 million), Italy (5.6 million), and France (5.4 million). In proportion to the population, Luxembourg (51%), Malta (31%), and Austria (22%) have the highest proportions of immigrants; Italy, with 8–9%, ranks in the middle. In recent years, the EU has experienced intense flows (e.g., the Syrian crisis, arrivals via the Mediterranean): in 2023 alone, there were 4.3 million new immigrants from non-EU countries to the EU. Italy, like Spain and Greece, shares many characteristics of southern Europe: a high incidence of irregular immigration from the Mediterranean (and consequent asylum requests), and a growing role of intra-EU immigration (e.g., EU citizens from Eastern Europe—Romanians in Italy, Poles in Germany). However, Italy presents a more limited picture: the percentage of foreigners is lower than in Germany, Austria, or Sweden, and the reception/integration system faces different challenges.

The average age of EU immigrants is similarly young (typically young adults), but differs in gender: for example, internal EU influx tends to be male (workers) or family-based, while the attraction of domestic workers to Italy has led to a female majority among foreigners. In terms of education, Italy attracts migrants with lower qualifications on average than countries such as Germany or Sweden (see the high *overqualification* rate of foreign workers in Italy).

Energy transition and green jobs in Italy

The start of Italy's energy transition dates back to the early 2000s, with the transposition of European directives and the promotion of renewables. In the years 2000-2010, there was significant growth in renewable energy installations. Starting in 2015-2020 – and even more so after 2020 with the EU Green Deal and the PNRR – the push has strengthened again. However, to fully seize the green opportunity, the country needs continued investment: in Italy, 38.6% of companies made eco-sustainable investments between 2019 and 2023, while bureaucratic bottlenecks remain.

Parallel to the growth of the green industrial supply chain, green employment has exploded. In 2022, there were estimates of over 3.2 million green jobs (13.9% of the workforce); in 2023, nearly 2 million new contracts were for "'green" roles (34.8% of all new hires). Green hires are mainly concentrated in logistics, design, plant technicians and infrastructure. To summarize, the circular economy and decarbonization are driving employment and growth, but with significant regional differences: Northern Italy is in the lead, Central Italy is catching up, and Southern Italy is lagging. At the macro-regional level, in 2022, the incidence of green hires out of total number of projected hires was highest in the Northwest (39.2%). At the end of 2020, Lombardy was firmly in the lead with 709,000 green workers (equal to 22.6% of the national green workforce and 16.1% of the Lombardy workforce).

In recent years, public funding has increased greatly, mainly thanks to the PNRR (National Recovery and Resilience Plan). Italy has allocated substantial resources to Mission 2, "Green Revolution and Ecological Transition": the waste management and circular economy component alone is worth €2.1 billion. Overall, public funding has affected green employment: in 2023, new green hires grew by 34.8% thanks in part to these incentives. Despite everything, however, 80% of green companies report difficulties in finding specialized professionals.

Green foreigners in Italy vs Green foreigners in Europea

Italy remains the European country with the highest incidence of foreign workers in *green jobs* (22.6% compared to an EU average of 14.2%). In 2023, the national green workforce numbered around 168,000 employees, with a clear segmentation: Italians 77.4%, EU workers 10.1%, and non-EU workers 12.5%. Italians dominate in specialized and skilled manual tasks, while non-EU workers are concentrated in basic operational activities (73% of manual workers), with wages 15-20% lower than native workers and a higher risk of accidents.

Historically, the foreign share has risen from 2% in 2000 to 36.5% in 2020, with projections of 40.4% in 2025, driven by energy crises, domestic labor shortages, and the European Green Deal. Ethnic distribution reflects structural barriers in skills recognition: 95% of Italian qualifications are validated, compared to just 45% of non-EU qualifications. Regulatory reforms (from an 18-month process in 2000 to 4 months today) have reduced time and costs, but bureaucratic obstacles and wage and sectoral discrimination remain.

A European comparison shows four models: North (low foreign presence, high recognition), West (balanced integration), South-Mediterranean (high incidence of non-EU nationals but low recognition), and East (minimal presence and backward systems). For Italy, the green hydrogen sector is the main challenge: today, 75% of workers are foreign, but only a quarter have formally certified skills.

By 2030, demand for foreign workers is expected to increase by 45% and the need for skills in hydrogen is expected to double. Strategic priorities include: reducing recognition procedures to 2 months, creating a "*fast track*" for emerging green skills, informal skills validation programs, and a European skills passport system.

The significant presence of migrant workers in green jobs (22.6% in Italy) and projections of a 45% increase in demand by 2030 are not a minor issue but a structural component of the energy transition. Unless this presence is converted into certified and employable skills, the result will be twofold and cumulative: wasted human capital (*overeducation* and underutilization) and widespread delays in the adoption and dissemination of strategic technologies. The operational implications are concrete: production inefficiencies, higher costs for businesses and public administration, increased exposure to accident risk, and wage inequalities that compromise social cohesion and contractual stability. Therefore, policies must aim at three simultaneous and measurable objectives:

1. Drastic and digital reduction in the time required for qualification recognition (operational *target*: 2 months);
2. Establishment of certified *up/re-skilling and "bridge"* pathways for emerging green skills (hydrogen, batteries, heat pumps);
3. A communal framework for certification equivalence (green skills passport) accompanied by anti-discrimination measures and monitoring of job quality.

Only through this combination of rapid recognition, targeted training, and supra-national *governance* can the integration of migrants be transformed into a competitive lever, accelerating decarbonization in an efficient, safe, and socially sustainable manner.

3.3.4 Biography

Luigi Campaniello is a highly qualified professional with a solid background in socio-demographic analysis and international cooperation.

Mr. Campaniello has a bachelor's degree in Linguistic and Intercultural Mediation and a master's degree in Development and International Cooperation Sciences, obtained in 2018 and 2023 respectively from Sapienza University of Rome. During his years of study, Luigi was also able to refine his techniques and practical knowledge by working with Fondazione con il Sud as an assistant evaluator and with Engin NGO as a migration office assistant. After completing his studies, Luigi consolidated his skills in quantitative data analysis and geospatial visualization at the Demomed - Mesopholis Mediterranean Demographic Observatory in Marseille. This experience gave him solid analytical skills, which earned him two scholarships (2024-2025) for specialized courses in advanced research at IAI (Istituto Affari Internazionali) and publications with Neodemos and CeSPI (Centro Studi Politici Internazionali) on Kurdish demographics in Turkey and the media coverage of protests in Turkey, respectively. He is currently collaborating with the University of Milan on the AVRAI project, which analyzes the health conditions of refugees in Italy, for which there is already a first collaborative publication.

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3.4 The employment of migrants in the agrivoltaic sector

Dr. Carla Ventre

3.4.1 Abstract and scope of the research

This report explores the emerging connections between ecological transition and social inclusion, with a focus on the agrivoltaics sector in Italy and Europe. In a context marked by the effects of climate change and the need to accelerate the energy transition, agrivoltaic systems are an innovative solution to optimize land use, combining agricultural production and solar energy generation. The analysis begins with a review of public policies—in particular the PNRR and PNEC—that support the development of the sector and puts forward some thoughts on the potential role of migrants in this area. Although there is currently a lack of empirical data on the actual integration of migrant workers in agrivoltaic enterprises, the report identifies some conditions that could foster inclusion, such as the emergence of new professional needs and synergies with social and work integration programs. The work therefore aims to be a preliminary contribution to the definition of a future research agenda in an under-researched sector.

3.4.2 Methodology

The study is based on a qualitative methodology based on the analysis of secondary sources, with the aim of outlining an interpretative scenario on the state and potential of the agrivoltaics sector in relation to the inclusion of migrants. In the absence of primary data, due to the unavailability of companies for firsthand interviews, the study included:

1. a review of regulatory and policy sources;
2. a review of existing literature on sustainable agriculture, agrivoltaics, and the integration of migrants into the workforce;
3. an analysis of possible synergies between technological innovation and social inclusion.

The approach adopted is exploratory and theoretical-descriptive, aimed at formulating hypotheses and guidelines for future empirical investigations. The agrivoltaics sector is now one of the most dynamic areas of agricultural and energy innovation, offering integrated solutions for the production of food and renewable energy.

Agrivoltaic systems allow the same land to be used for both agricultural activities and photovoltaic production, optimizing available resources and reducing land consumption. Within this context, there is also room to reflect on the social implications of this transformation, and in particular on the possibility of integrating migrant workers into the new agro-energy paradigm. All the same, to date, the link between agrivoltaics and migrant inclusion has been little explored, both academically and in business practice. This report aims to offer an initial theoretical and regulatory overview, useful for charting possible future paths for research and intervention.

3.4.3 Description of the research and main findings

Introduction

The energy transition to renewable sources is one of the main challenges and opportunities of the 21st century. In Europe, and particularly in Mediterranean countries, the change in the energy paradigm is accompanied by a profound economic and social transformation. Among the emerging sectors, agrivoltaics stands out for its ability to integrate agricultural production with solar energy production, offering new development opportunities for rural areas and disadvantaged categories of workers, such as migrants. The employment of migrants in this still largely unexplored but potentially strategic sector can help meet the growing demand for labor, while promoting sustainable and inclusive models of development.

A just and inclusive transition

According to the joint report by IRENA (*International Renewable Energy Agency*) and ILO (Organizzazione Internazionale del Lavoro or International Labor Organization), in 2023 the renewable energy sector employed approximately 16.2 million people globally, up from 13.7 million in 2022 (IRENA & ILO, 2024). Migrant workers are a key component of this workforce, especially in industrialized countries where the local workforce is often insufficient to meet the needs of new green industries (ILO, 2024).

The *Renewable Energy and Jobs* report highlights the need for a "just and inclusive transition," which includes active policies for training, social protection, and work integration of vulnerable groups, including migrants. Coordination between training providers, employment services, and institutions is essential, including through local content requirements in calls for applications, in order to create jobs and develop skills, as various international examples show.

The *Renewable Energy Independent Power Producer Procurement Programme* (IPPPP) in South Africa (IRENA & ILO, 2024) is a significant example of integration between industrial policies, employment, and training. The program sets out contractual obligations for selected companies, including local content and national shareholding requirements, thereby promoting domestic production of renewable energy components and the development of professional skills. In addition, companies are required to support local socio-economic development initiatives, with a particular focus on education and training throughout the life cycle of the projects. In 2020, with ILO support, the *Green enterPRIZE* in Zimbabwe (ILO, 2022b) actively involved government agencies, corporations, technical companies, vocational training institutions, and social partners. A key element was the organization of workshops to train trainers, with the aim of creating a qualified teaching staff for the new courses. In addition, the program has fostered the creation of partnerships between training institutions and small and medium-sized enterprises, encouraging the experimentation and expansion of work-based learning pathways.

The *Pact for Skills* (Patto per le Competenze) promoted by the European Commission (EC, n.d.) is a strategic initiative that aims to strengthen skills within the renewable energy industrial ecosystem through structured collaboration involving more than 40 employer organizations and 35 chambers of commerce across Europe. This partnership aims to monitor the supply and demand for skills, anticipate future needs, promote a culture of lifelong learning, and ensure equal opportunities by combating both gender and other forms of discrimination. The Pact also serves as a platform for sharing knowledge among governments, workers, businesses, and other relevant parties, facilitating the exchange of best practices for retraining and professional development, with the goal of transforming the job market in a sustainable and inclusive way.

Therefore, the effective integration of migrants into the renewable energy sector requires an integrated approach that involves labor policies, training, social protection, and regional planning. The agrivoltaics sector is particularly important for the integration of migrants, who play a crucial role in supporting agricultural production and revitalizing local economies (JRC, 2019). In Italy, for example, migrants make up over 25% of the agricultural workforce, with peaks of over 50% in some southern regions (CREA, 2020). A just and inclusive transition in rural areas, already characterized by the presence of foreign workers, is therefore a concrete opportunity for their retraining and employment stabilization.

Agrivoltaic in the EU

Achieving the climate targets set by the European Union implies not only a profound transformation of the energy system, but also a significant impact on land use and labor demand. This process entails a growing dependence on migrant labor, particularly in renewable energy and decarbonization related sectors, with consequent changes in the working conditions of foreign workers. Despite the relevance of these dynamics, the migration dimension in the context of climate policies remains largely unexplored.

Agrivoltaics stems from the need to decarbonize the economy and ensure food security, finding its political framework in the European Green Deal (2019) and the Farm to Fork strategy (2020). These initiatives aim to achieve climate neutrality by 2050, reduce the environmental impact of agriculture, and promote innovative production systems. In this context, agrivoltaics allows for optimized land use, reduced emissions, and increased climate resilience of crops.
Regulatory support is reinforced by the RED II Directive (and RED III, 2023), which simplifies the installation of renewable energy plants, and by the Fit for 55 legislative package (2021), which aims to reduce emissions by 55% by 2030. These instruments have encouraged the inclusion of agrivoltaics in the National Energy and Climate Plans (NECPs) and National Recovery and Resilience Plans (NRRPs).

A comparison of European countries shows that some have introduced more structured and flexible measures.

In Italy, the PNIEC and PNRR allocate €1.1 billion to the installation of advanced agrivoltaic systems. The MASE guidelines (2022) stipulate that such systems must maintain agricultural continuity, enable the use of machinery, integrate digital systems, and ensure energy efficiency. However, the first round of funding saw low participation due to technical complexities and high initial costs. In 2025, the call for proposals was reopened, introducing measures to simplify the process and facilitate access for agricultural cooperatives and companies that include migrant workers, with a view to recognizing their contribution to the ecological and social transition.

In France, *l'agrivoltaïsme* l'agrivoltaïsme (agrivoltaism) has been included in the Renewable Energy Acceleration Act (2023), with simplified procedures for agriculturally integrated installations[1].

In Germany, pilot projects have been supported by public funding since 2016 and now benefit from differentiated incentive tariffs for agrivoltaic installations[2].

In the Netherlands, on the other hand, agricultural energy cooperatives receive technical assistance and facilitated access to credit[3].

These experiences highlight the importance of stable instruments, technical advice, and direct farmer involvement in promoting the spread of the agrivoltaics model, suggesting that a clear regulatory and financial framework can accelerate its adoption even in fragile rural contexts.

[1] LOI n° 2023-175 du 10 mars 2023 relative à l'accélération de la production d'énergies renouvelables (APER).
[2] Smart Energy Showcases – Digital Agenda for the Energy Transition' (SINTEG) funding programme.
[3] Wageningen Solar Research Programme.

European projects and case studies

In European Union countries, the integration of immigrants into agrivoltaic systems is still in its infancy, but there are promising initiatives that combine environmental sustainability, social inclusion, and local development.

Italy

The project "TANdem Italo-Tunisien" (TANIT), promoted by the Italian Ministry of Environment and Energy Security and co-financed by the Agenzia Italiana per la Cooperazione allo Sviluppo or Italian Agency for Development Cooperation (AICS), is a bilateral initiative involving Tunisia and Italy in the promotion of agrivoltaics and sustainable development (AICS, 2025).

The project is part of the Mattei Plan for Africa and aims to address the repercussions of climate change and ensure food security, centering on three components related to wastewater treatment, improving agricultural yields, and enhancing training, research, and innovation in the agrivoltaics sector (Italian Government, 2025).

The project involves the creation of agrivoltaic plants on both sides of the Mediterranean, with joint training courses for Tunisian and migrant youth in Italy. In particular, TANIT aims to promote job placement through technical training courses, workshops on labor law, and internships at farms in Southern Italian regions (Confagricoltura, 2024).

The project is a virtuous example of international cooperation and inclusive development, with a strong impact on local communities and migrants' paths to autonomy. It also constitutes a replicable model in other rural areas of the Mediterranean, especially where transnational economic and social ties already exist.

Spain

The MIPED *(Migrants in the Politics of Energy Decarbonisation*), project, funded by the Horizon Europe program (*Marie Skłod- owska-Curie Actions*), studies the role of migrants in the energy decarbonization process in Spain, with a particular focus on the agricultural regions of Andalusia. In these areas, characterized by large areas of cultivated land and high solar radiation, numerous ground-mounted photovoltaic and agrivoltaic systems are being installed. MIPED has found that migrant workers, mainly from North Africa and Latin America, are employed in various stages of the production cycle: land preparation, panel assembly, electrical connections, and maintenance (MIPED, 2025).

MIPED aims to analyze how immigrant workers' concerns are included or excluded in decarbonization activism strategies and networks, seeing how these dynamics are influenced by the social and spatial interactions between immigrant workers, union activists, environmental movements, and climate justice organizations. Particular attention will be paid to understanding the social inequalities and ethical implications that permeate the sector, directly linking workers' experiences with organizational strategies (CORDIS – EU Research Results, 2025).

MIPED's approach points out that the ecological transition risks regressing socially if it does not incorporate specific measures for the work inclusion of migrants from the policy design stage onwards. Recognizing their contribution and creating stable career paths are therefore essential elements in ensuring that decarbonization is truly just and inclusive.

France

Founded in 2005 to combat climate change and energy dependence, Enercoop is a cooperative committed to providing 100% renewable energy, operating in several regions of France. The cooperative is founded on the principles of transparency, participation, and social inclusion, ensuring that the energy transition benefits both local communities and the environment (Enercoop, 2023).

Enercoop supplies electricity produced exclusively from renewable sources with over 470 production sites distributed throughout France, half of which are owned by citizens or local authorities. The cooperative actively involves its members in decision-making processes, prioritizing community needs while addressing global environmental challenges (*EU Proximity and Social Economy platform*, 2025).

Despite its many successes, Enercoop has faced challenges in growing its model, balancing operating costs and its social mission through innovative solutions and partnerships with universities and research centers (Enercoop, 2023).

Among the many solidarity and social inclusion projects promoted by the cooperative, in 2023 it began a collaboration with the Kodiko association, aimed at fostering the professional and social integration of refugees through a six-month support program. The project provides a dual support system: individual support, with an employee from a partner company working alongside the refugee to help them become independent in their search for work or training, and collective support, with French language courses, vocational training, digital laboratories, and workshops (Enercoop & Kodiko, 2023).

The results achieved are very positive: 47% of participants find a job or access training within six months of starting; 56% maintain their employment or training after one year; and 87% feel self-sufficient in their job search at the end of the program. In addition, employee mentors demonstrate a strong commitment and partner companies report a positive change in the perception of refugees (Enercoop & Kodiko, 2023).

Enercoop has developed an integration model that includes not only employment but also social support with language courses, guidance on labor rights, and assistance in finding housing (Enercoop, 2023).

In addition, the cooperative has created a work group dedicated to agrovoltaics to address the needs of some farmers, gathering data and information essential for assessing its feasibility and promoting its development. This initiative underscores the cooperative's commitment to supporting innovative solutions that combine agricultural production and renewable energy, thus contributing to a more integrated and sustainable energy transition in the agricultural sector as well (Enercoop, 2023).

Germany

Although Germany does not yet have any structured examples of the work inclusion of migrants specifically in the agrivoltaics sector, the country does have advanced training and integration initiatives in sectors related to the ecological transition. One example is capacity building programs that operate internationally to source skills in the green economy sector, in collaboration with universities, vocational schools, and United Nations agencies such as the International Organization for Migration (IOM) (*greentech.training – Community Integrated Sustainability*, n.d.).

These programs aim to integrate international workers into key sectors by providing:

- *traineeship* services, supported by social services to facilitate integration into the workplace;
- administrative support for visas, professional recognition, and human resources management on behalf of companies;
- community embedment, i.e., actions to root workers in local communities and facilitate mobility to different regional areas.

These practices, already in place in areas such as renewable energy and sustainable water and agricultural resource management, are also a replicable model for the budding German agrivoltaics sector, where migrant labor can make a strategic contribution to the construction and maintenance of plants. The adoption of these models from the early stages of the sector's development could ensure the structured and skilled inclusion of foreign workers.

3.4.4 Conclusions

The integration of migrants into the agrivoltaics sector not only helps to meet the manpower needs of the energy transition but also promotes social cohesion and sustainable territorial development.

To consolidate these opportunities, it is essential to:

- Strengthen technical training programs, including specific modules for the agrivoltaics sector and adopting an intersectional perspective that considers the gender, origin, and socio-economic conditions of migrants;
- Promote multi-level partnerships among institutions, businesses, training organizations, and civil society organizations;
- Foster social protection and labor rights policies to avoid forms of exploitation and job insecurity;
- Encourage research and monitoring of placement experiences in order to develop policies based on concrete data and best practices

The experience of European and international projects, such as TANIT and MIPED, shows that an integrated approach can yield both environmental and social benefits. For the green transition to be truly just and inclusive, there needs to be structural alignment between migration policies, decarbonization strategies, and rural development tools. From this perspective, migrants are not only beneficiaries of policies, but active players in the transformation towards a sustainable and resilient economy.

3.4.5 Biography

Carla Ventre is a PhD student in Economics and Development at the Department of Social and Economic Sciences of Sapienza University of Rome.

Ms. Ventre's research focuses on the integration of migrants in small Italian municipalities and the evaluation of the SPRAR/SIPROIMI reception system. She obtained a master's degree in Migration and Development in 2022 and a master's degree in Development and International Cooperation Sciences in 2021, both from Sapienza University of Rome, and has participated in prestigious international summer schools, including one at the Paris School of Economics and another at the IMSCOE PhD Summer School in Lancashire (UK). Since 2024, she has been a member of the UNESCO Chair in Population, Migration, and Development and scientific director of a research project on local migration and development. She has collaborated on European projects, carrying out qualitative research and scientific dissemination activities. She is the author of publications on migration policies, vulnerable female populations during the pandemic, and the repopulation of inland areas.

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3.5 Lessons learned from the Netherlands: how businesses are successfully integrating migrants in the energy transition

Dr. Angelique Witjes

3.5.1 Abstract and scope of the research

This research examines the role of training and work-study programs in preparing migrants, specifically status holders, for employment in the evolving green labour market. Integration, however, is far from straightforward. Language proficiency emerges as both the greatest barrier and the most powerful enabler of long-term success, while cultural differences and the need for sustained support from employers and governments add further complexity. Interviews highlight that effective integration depends not only on technical training but also on tailored preparation, ongoing guidance, cultural sensitivity, and strong employer engagement, where the quality of the employer–employee match is prioritized over skills alone.

Focusing on the Netherlands, the study analyses a set of initiatives that connect status holders with employment in technical and green sectors of the energy transition. These cases highlight practical strategies and success factors that can inform future training models, offering replicable pathways for inclusive integration while addressing labour shortages and green skill demands.

3.5.2 Methodology

This research investigates effective strategies used by Dutch companies to integrate low-to-medium skilled migrant workers into the energy transition workforce. The study includes several integration projects that vary in scale, geographic location, and sector focus within the energy transition. These cases were identified through desk research. Data collection involves four semi-structured interviews with representatives from companies and intermediary organizations actively engaged in these programs: Marijn van Roekel, operational manager training at Technical Valley; Zeb Bergsma, managing consultant at Wise UP Consultancy and subject matter expert "more technicians" at Mensen Maken de Transitie (MMT); Mieke de Vries, project leader and supervisor of a 2.5-year work-study program for status holders from the Sustainable Electrical Energy Centre of Expertise (SEECE) and HAN University of Applied Sciences; and Ward Overeem, project leader for the Europees Sociaal Fonds (ESFplus) at Opleiding Ontwikkeling Metaalbewerking (OOM). The interviews seek to uncover strategies, challenges, and success factors in workforce integration. In addition to interviews, primary and secondary sources, such as policy documents and internal reports are used. Thematic coding is used to analyse qualitative data and identify cross-case patterns. Particular attention is given to programs that include training and skills development components, such as the pilots from Stedin and Liander. A literature review explores existing research on integrating migrants and status holders into the labour market, focusing on the energy transition. It also discusses workforce trends like labour shortages and the growing need for green skills. Together, the interviews and review provide a framework for identifying effective integration methods.

3.5.3 Description of the research and main findings

Best practices for the successful labour market integration of status holders in the energy transition

While the green transition is expected to create millions of new jobs, such as the estimated 39,000 to 72,000 additional roles in the Netherlands by 2030 (Van Kesteren et al., 2024), it also brings significant challenges. A key issue is the lack of consistent definitions for “green jobs” and “green skills,” which limits data comparability and public awareness (Simmonds & Lally, 2024). Green jobs are generally described as employment that contributes directly or indirectly to environmental goals, especially net-zero targets (Simmonds & Lally, 2024), and span a wide range of sectors from energy to finance (Zaussinger et al., 2025). The

transition requires a major shift in workforce competencies, with a strong emphasis on upskilling and reskilling since 80% of the 2030 workforce is already employed today (Simmonds & Lally, 2024). Encouragingly, 13 of the 18 general "brown" skills overlap with 28 "green" skills, which reduces adaptation costs (Brunetti et al., 2025). However, labour market frictions continue to be a significant barrier, especially with shortages in engineering and technical fields (Van Kesteren et al., 2024). Therefore, new pathways to the labour market have been created in the form of recruiting refugees and status holders (Van Dijk, 2024; *Statushouders Aan De Slag Voor De Energietransitie*, 2023; International Organization for Migration (IOM), 2024; Duiveman et al., 2025; Sociaal-Economische Raad, 2021). A status holder is an asylum seeker whose application has been approved, recognizing them as refugees or individuals needing international protection (Bergsma, 2024). Unlike asylum seekers, status holders have the legal right to work, access social services, and live independently in the Netherlands.

Tailored preparation and professional orientation

Recruiting refugees and status holders is possible with the help of work-study programs. A key success factor in work-study programs for status holders is early and targeted preparation. Employers express a clear need for structured onboarding programs that include language training, cultural orientation, and field-specific knowledge (Bergsma, 2024). These preparatory programs serve as bridging tools, aligning the refugees' backgrounds with the expectations of the Dutch labour and education systems (Bergsma, 2024). Beyond technical skills, status holders often need help developing essential 'professional skills', such as working in teams, understanding hierarchy, and presenting themselves in structured settings (Stavenuiter et al., 2019; see Appendix B). These norms, while commonplace for local employees, can be unfamiliar due to different educational systems or disrupted learning paths (Stavenuiter et al., 2019; see Appendix B).

Examples of tailored integration programs

Tailored programs that teach "how to work the Dutch way" play a crucial role in building workplace readiness (see Appendix D). Practical examples include work-study pilots by Stedin and Liander, where language and professional development are central (Baan et al., 2020). Stedin includes a four-month preparatory course before entering a dual work-study program of 24 months, while Liander offers a 15-month study period (of which 6 months full-time schooling) followed by 24 months of practical experience leading to a 39-month program (Baan et al., 2020). Both programs embed language learning and adjust training speed to participant needs (Baan et al., 2020; SER Diversiteit in Bedrijf, 2022). Stedin focuses on language as a fixed component of the program and has its own company school (Baan et al., 2020; SER Diversiteit in Bedrijf, 2022). Liander on the other hand hires Quercus, an outside school, to train the status holders (see Appendix A; Baan et al., 2020).

Marijn van Roekel, who organises and helps execute Quercus' training for Liander, explained how extending a standard three-month course into six months for status holders is necessary (see Appendix A). The adjustment allows extra time for theory, certification preparation, and language improvement (see Appendix A). These adjustments demonstrate that success

lies in tailoring programs, not just academically but also culturally and emotionally, to meet participants where they are. Furthermore, partnerships with organizations such as, UAF (a refugee organization), Technical Valley, and Talent voor Transitie, strengthen these programs by offering mentorship and guidance. According to Alliander, long-term support and development pathways are essential for sustainable labour integration (Baan et al., 2020). Programs also rely on strong team engagement and intercultural awareness to create welcoming environments (*Statushouders Aan De Slag Voor De Energietransitie*, 2023).

Investing in language training for long-term success

Immigrants possess many valuable skills that the labour market should recognize, but they also need to acquire new ones, especially the language of the host country (OECD, 2014). Language proficiency, particularly at B1 or B2 level, is both the biggest barrier and the most powerful enabler for successful labour market integration (Baan et al., 2020; see Appendix A; see Appendix B). Therefore, leading programs now emphasize language-intensive training as a central pillar, shifting away from 'practice-heavy' models (Baan et al., 2020).

Embedding language learning into vocational training

At Technical Valley, Dutch lessons are embedded at the start of training to ensure better performance in both theory and practical experience (see Appendix A). Stedin similarly offers extra language lessons and a buddy system, which pairs participants with native-speaking colleagues (SER Diversiteit in Bedrijf, 2022). These efforts are vital for technical training and for navigating day-to-day communication in the workplace (SER Diversiteit in Bedrijf, 2022).
Within this success lies the technical language acquisition, which is essential for long-term labour market participation (De Bell et al., 2022; see Appendix A). Courses such as "Dutch language in the workplace" have proven effective in simultaneously building verbal skills and deepening understanding of technical and sustainability-related subjects (Duiveman et al., 2025). However, the acquisition of professional jargon cannot be rushed. The expectation that status holders can internalize such language within a short timeframe, such as a 10-week course, is considered unrealistic (Duiveman et al., 2025). Nevertheless, to accelerate learning, language support could be embedded alongside vocational and practical training, enabling immediate application of newly learned terms and improving retention (De Bell et al., 2022). Integrating subject-specific language and employee skills into both theory and practice enhances learning effectiveness and boosts confidence (International Organization for Migration (IOM), 2024).

Furthermore, programs are more effective when training is done in small, separate groups, which allows instructors to adjust content and pacing to match participants' language abilities (International Organization for Migration (IOM), 2024). This setting also fosters personal attention and trust, contributing to self-confidence and openness (International Organization for Migration (IOM), 2024). To further support learning, language buddies have been introduced in multiple programs (Baan et al., 2020; Sociaal-Economische Raad, 2021; Berenschot, 2021; SER Diversiteit in Bedrijf, 2022). These mentors help integrate language into daily work life and facilitate smoother social and professional transitions (International Organization for Migration (IOM), 2024; Baan et al., 2020).

Innovative language tools

Despite these efforts, many status holders still struggle to reach the necessary language level by the end of their training. The Liander and Stedin pilots demonstrated that, while language training was a core element, it often was not sufficient on its own (Baan et al., 2020). Language continued to present challenges, impacting social integration and workplace communication (Baan et al., 2020). Misunderstandings occasionally led to tensions with colleagues or negative performance reviews (Baan et al., 2020). Cultural norms, such as eye contact or tone of voice, added an extra layer of complexity, further underscoring the need for guided support rather than expecting participants to navigate these issues independently (Baan et al., 2020).

To bridge these gaps and support the need to develop curricula that align more closely with the learning levels and practical realities of the participants, innovative tools such as the "Vaktaalapp" (professional language app) have been introduced (Duiveman et al., 2025; Baan et al., 2020). This app provides visual and audio support for technical terms, enabling users, particularly illiterate or low-literate learners with A0–B1 proficiency, to familiarize themselves with workplace vocabulary ("De VaktaalApp," n.d.). The app includes photos, audio in Dutch, and even allows participants to upload images of unknown equipment for customized glossary entries in their own language ("De VaktaalApp," n.d.). This tool supports independent learning while complementing classroom instruction. Its value has sparked attention, prompting interest in nationwide distribution to ensure consistent language support beyond sector-specific lists (see Appendix C).

Why employer engagement matters

Employer involvement often determines the success of integration efforts. Large companies like Liander and Stedin have played a key role by offering financial support, job guarantees, and structured guidance (International Organization for Migration (IOM), 2024). Their success is rooted not only in these contributions but especially in their early and sustained commitment to status holders. To replicate these results, employers must be engaged from the earliest stages. They should be informed about the potential of newcomers, the available support mechanisms (such as subsidies), and the importance of clearly documenting expectations and job guarantees (Fontein & Gesink, 2025; Duiveman et al., 2025). Developing entry profiles together and aligning on long-term benefits lowers hiring barriers and improves employment outcomes (Duiveman et al., 2025).

At the same time, it is important to recognize that many newcomers face visibility challenges in a new labour market (Muller & Beckers, 2018). They are unfamiliar with local recruitment platforms and lack experience with presenting themselves through CVs (Fontein & Gesink, 2025). As a result, they remain largely invisible to potential employers (Fontein & Gesink, 2025).

Building supportive hiring environments

There is little value in training newcomers if companies are unwilling to hire them. Success stories from the field show that knowledge sharing within sectors and peer-to-peer encouragement can build employer confidence (Berenschot, 2021; see Appendices A & D). Many employers are unfamiliar with this target group, yet those who commit early and fully, by helping to co-design work-study programs, achieve better long-term results (International Organization for Migration (IOM), 2024).
Programs that support both the employer and the candidate, with tailored coaching and

onboarding, tend to be the most effective, even if they require higher initial investment (Bergsma, 2024). Employers are therefore advised to collaborate closely with expert partners like municipalities, refugee foundations, employee insurance agencies (UWV), and employer service points, and ensure sufficient internal resources for coaching (Berenschot, 2021; Baan et al., 2020; De Bell et al., 2022). Additionally, success depends on creating real opportunities: placements must offer a genuine prospect of paid employment (Sociaal-Economische Raad, 2021; see Appendix A). Initiators emphasize that employer flexibility and commitment are essential, only once participants have gained experience and skills does the employer's investment pay off (Sociaal-Economische Raad, 2021).

Practical steps toward sustainable integration

Employers are advised to actively participate in the selection process by developing realistic entry profiles with intermediaries (De Bell et al., 2022). These profiles should emphasize motivation and learning capacity over formal qualifications or language skills (SER Diversiteit in Bedrijf, 2022). Soft skills, informal experience, and affinity with the sector, for instance, hobby-based technical skills, should also be valued (Baan et al., 2020; Berenschot, 2021). Furthermore, to facilitate strong matches, introductory activities such as workplace visits or shadowing days are highly recommended (Duiveman et al., 2025). These help employers spot potential and allow candidates the chance to demonstrate hidden talents. Finally, appointing a 'connector', someone with a refugee background who bridges the gap between employer, candidate, and municipality, can significantly strengthen communication and alignment throughout the placement process (International Organization for Migration (IOM), 2024).

Personal matches

As Zeb Bergsma and Ward Overeem stressed, the quality of the match between employer and employee is ultimately more important than technical skills alone (see Appendices C & D). To support employer readiness, external organizations, such as OOM organize low threshold Meet & Greet sessions, ranging from informal breakfasts to structured roundtables, to connect status holders with potential employers and inform them about the practicalities of hiring refugees (see Appendix D). These events help dispel uncertainties, build employer confidence, and facilitate early-stage matching based on often unstated 'soft' requirements, such as motivation, personality, and shared values, which are key factors for long-term integration (Duiveman et al., 2025). Therefore, mediators play a crucial role by discreetly uncovering these preferences to enable more accurate and sustainable matches (see Appendix D; Duiveman et al., 2025).
As Ward Overeem noted, "It is better to know everything now than to have the match fall through later" (see Appendix D). Meet & Greet sessions, therefore, help employers and status holders explore compatibility early in a relaxed setting. This uncovers potential mismatches and sets shared expectations. Matching goes beyond skills, it requires understanding the personal and cultural context. Questions such as "What happens when their child is sick?" or "How do they see themselves in Dutch work culture?" help surface key differences and prepare both sides for successful integration (see Appendix D). In addition, practical topics, such as sick leave procedures, pay structures, and benefits must also be addressed. One helpful tool is the "disease ladder," a visual five-step guide to clarify when employees should stay home or simply notify a supervisor, reducing absenteeism and misunderstandings (see Appendix D). Companies such as Stedin and Liander also prioritize personal matchmaking from the start of training. This initial focus helps refugees feel welcome in the team, ensuring

colleagues are open to guiding and supporting them, which creates an environment for learning and growth (Baan et al., 2020).

Addressing cultural differences in the integration programs

Cultural adaptation should not be expected solely from status holders. The interviews with education and training providers revealed that misunderstandings or dropouts often result from mismatched expectations on both sides (see Appendices A, B & D). As such, programs that incorporate cultural orientation sessions for employers, team leaders, and Dutch colleagues are more likely to foster long-term inclusion.

Employers must acknowledge the varied backgrounds of refugees and tailor their support accordingly. Intercultural training offered by external parties, equips employees with the skills to communicate across cultures and foster inclusion (International Organization for Migration (IOM), 2024). Trainings from expert organizations, such as Language Partners/BBi Communication use practical examples and film footage to help participants understand Dutch corporate culture and manage communication differences (International Organization for Migration (IOM), 2024). Therefore, employers are also encouraged to invest in the knowledge, skills, attitudes, and behaviour (interactions) of all levels of the organization (top and middle management, HR, operational staff) regarding refugees (Berenschot, 2021). This includes training on exclusion mechanisms, migration history, and cultural and religious sensitivity (Berenschot, 2021). Managers and supervisors must be trained in managing multicultural teams, including leadership and intercultural communication to achieve successful integration of status holders (International Organization for Migration (IOM), 2024; SER Diversiteit in Bedrijf, 2022).

External coaching and buddy systems

Status holders from hierarchical cultures often face challenges in directly communicating with managers, which can hinder their integration into the workplace (International Organization for Migration (IOM), 2024; see Appendix B; Van Dijk, 2024). An external job coach offers a solution by creating a safe and independent space for status holders to discuss experiences and ask questions (International Organization for Migration (IOM), 2024). Acting as a bridge between cultural differences, the coach provides tailored guidance that contributes to sustainable placement. Due to their independency, coaches can address sensitive topics that status holders may not feel comfortable raising with colleagues or mentors, support that is often crucial for the success of a work-study program (International Organization for Migration (IOM), 2024). In addition, implementing a buddy system, preferably with experienced employees or colleagues with similar backgrounds, can help refugees feel included and supported in the workplace (International Organization for Migration (IOM), 2024; Bakker et al., 2021). Assigning a dedicated contact person for both work-related and practical matters is also essential for ensuring continuous support throughout the integration process (Berenschot, 2021).

In the end it is all about the company's support and willingness to overcome cultural differences. Or as Marijn van Roekel from Technical Valley mentioned: "It is difficult to integrate a status holder, but we do it anyway." (see Appendix A). Van Roekel stressed that the attitude within a company should resemble this mindset, as the top-down approach will lead to others accepting and adjusting to a more positive perspective on the experience of working with a 'non-regular' employee (see Appendix A).

The skills passport: preconditions, and practical challenges

As labour market mismatches grow and traditional diplomas prove insufficient, the skills passport emerges as a promising innovation. It is a digital tool that documents and validates not only an individual's knowledge and skills, but also personality traits and motivations (Post et al., 2022; Van Genabeek et al., 2022). Its main goals are to improve access to education and work and support lifelong learning (Ballafkih et al., 2022).

Addressing skills gaps, inequality, and accessibility in the skills passport

The skills passport was developed to counteract longstanding challenges such as information asymmetries and skills mismatches (Post et al., 2022; Van Genabeek et al., 2022). Traditional diplomas, while once the primary source for assessing capabilities, often become outdated after a few years of work experience. They also tend to restrict entry into a narrow selection of professions and fail to capture the capabilities of individuals who lack formal qualifications but have acquired relevant skills informally (Ballafkih et al., 2022). This information gap makes it difficult for employers to properly assess potential candidates, while workers, particularly school leavers, migrants, and lateral entrants, struggle to demonstrate their abilities (Post et al., 2022; Ballafkih et al., 2021).

In addition, the lack of a standardized skills language complicates the comparability of skills across sectors, institutions, and job roles (Post et al., 2022). Without a shared vocabulary, both recognition and validation of skills remain fragmented and inconsistent. Moreover, there are concerns that the skills passport might inadvertently reinforce social inequality, as individuals from higher socio-economic backgrounds are more likely to accumulate credentials and experiences that enrich their passport (Post et al., 2022). Despite these concerns, the skills passport is seen as a tool that can bridge formal and informal learning, creating dynamic and holistic skill profiles (Post et al., 2022). Unlike static diplomas, it includes soft skills, practical experience, and personal goals, giving a fuller picture of a candidate's potential (Van Genabeek et al., 2022). Employers can use it to improve job matching, promote labour mobility, and better align recruitment with actual skill levels (Post et al., 2022). For employees, it can guide career development and encourage self-reflection, particularly in rapidly evolving sectors (Van Genabeek et al., 2022).

Governance and practical tensions

There are also important questions about governance, ownership, and purpose. Employers tend to view the skills passport as a recruitment tool, while employees and educators see it as a developmental tool (Ballafkih et al., 2021). This mismatch leads to concerns about data control and transparency. While employers want detailed profiles, individuals often prefer to decide what information is shared and when (Ballafkih et al., 2022; Post et al., 2022). Furthermore, it is important to maintain a balance between standardization and customization. Uniform formats are needed for national scalability, but sectors may require tailored content to remain relevant (Post et al., 2022). These tensions highlight the need for collaborative governance, involving employers, employees, educators, and government (Ballafkih et al., 2022).

3.5.4 Biography

Angelique Witjes is a researcher with a strong academic background in security, human rights, sustainability, and migration.

In 2024 she completed a master's degree in security and human rights from the University of Tuscia in Italy. Her thesis explored the geopolitical dynamics surrounding climate refugees, highlighting the complex interplay between environmental crises and forced migration. Her current study aims to bridge the gap between green innovation and social inclusion by examining how the energy sector can serve as a platform for equitable participation and long-term sustainable employment. In addition to her research, she is currently working on Community in Action, a project by Justice & Peace in The Hague. This initiative focuses on fostering greater inclusion and connection between migrants and Dutch citizens at the local level, reflecting her ongoing commitment to practical, community-based approaches to social justice.

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3.6 Green skills and global talent: a pathway for refugees and the UK economy

Talent Beyond Boundaries - *Sarah Walder*

3.6.1 Abstract and scope of the research

This research project focuses on bridging the skills gap in the UK's green transition by leveraging the talents of refugees and displaced people, also known as "displaced talent." It identifies specific labor market needs within the green sector and then maps the existing and transferable skills of refugees to see how they can fill those roles. A key part of the research is identifying and analyzing the barriers that prevent displaced individuals from getting these jobs, both in their host countries and in the UK. The project also looks at the unique challenges faced by skilled refugee women, who often encounter additional obstacles despite having qualifications for green jobs. The UK serves as a unique case study for this research, as the first country in Europe with companies hiring refugees for green jobs through non-profit organisation Talent Beyond Boundaries (TBB). The study highlights the use of the Talent Catalog, a tool developed in 2016 by TBB that has a database of over 139,000 displaced people and is used by TBB to help match them with job opportunities abroad. This research also points out the need for employers to provide support, such as orientation and integration programs, to help new employees succeed. The research also puts forward recommendations to effectively address the skills gap in the UK's green energy sector by empowering and supporting refugees to overcome barriers to work in this sector.

3.6.2 Methodology

This scoping study utilized a multi-faceted approach to understand the green skills landscape in the UK and the potential for refugees to fill those roles. The research began with an extensive desk review of existing literature, government policies, and job postings to define "green skills" and identify current and future demand. This phase also involved an initial search of the Talent Catalog which yielded 4,702 potential candidates with relevant skills. We then analyzed this group by gender, nationality, location, qualifications, and English proficiency. To gather more direct data, a survey was distributed to 400 displaced people on the Talent Catalog to find out more about green skills and qualifications in refugee populations, and barriers they face to accessing work in green skills jobs in their host country and in the UK. 116 people responded to the survey (31% women, 69% male respondents). In a separate effort to understand the political and employer perspective in the UK, TBB attended the All-Energy Conference in Scotland in May 2025. During the conference, we engaged with policymakers and employers in the green sector, taking detailed notes on the skills companies are seeking and the specific challenges they face when considering hiring refugees. Additionally, in September 2023 two Syrian refugees moved to Scotland to work as engineers in the energy industry. We collected feedback from these two professionals after they arrived to understand their transition to working in green skills in the UK. We also surveyed the employer to understand their motivations for hiring refugees, and collect feedback about the employees skills and their integration into the UK.

3.6.3 Description of the research and main findings

What are "green skills?"

The term "green skills" is a broad term encompassing a range of skills and occupations. Several international organizations offer widely recognized frameworks. The International Labour Organization (ILO) defines green jobs as "decent jobs that contribute to preserving and restoring the environment, whether in traditional sectors such as manufacturing or construction, or in new, emerging green sectors" (ILO, 2023).[1] At the EU level, Eurostat and OECD conceptualize green employment through the lens of the "environmental goods and services industry," which includes activities such as recycling, pollution control, and restoration (European Commission & OECD, 2024). Green skills could also be defined as those attributed to "green jobs", which the UK's Green Jobs Taskforce defines as "employment in an activity that directly contributes to - or indirectly supports - the achievement of the UK's net zero emissions target and other environmental goals". The UK government has set a target for the UK economy to be net zero by 2050. It is expected there will be high demand for green skills, a risk of skills gaps (when workers lack necessary skills to complete their role) and skills shortages when vacancies go unfilled due to a lack of skills (UK Parliament Post, 2024). A 2024 Linkedin report found "By 2050, there will be twice as many jobs requiring green skills as people qualified to fill them." The World Economic Forum also reported the global number of green roles has grown 8% per year for the last five years. The evidence points towards green skills jobs being in high demand for the foreseeable future, and a lack of current workforce and skills to meet this demand. The UK Governments Green Global Taskforce[2] identified some sectors to focus on to achieve net zero by 2050: Power (renewables , nuclear); Business and industry (hydrogen production); Buildings (energy-efficient homes, heat pumps); Transport (low or zero emission vehicles); and Natural resources (nature restoration, waste management and recycling). There is no single, universally accepted classification system which defines what falls under the "green economy". These different frameworks highlight a fragmented landscape in defining what "green skills" are—varied in scope, sector focus, and regional applicability—suggesting a strategic opportunity for standardization, and could be particularly relevant to tools like the Talent Catalog that map refugee skills to green job sectors.

Talents on the Talent Catalog

There are currently over 139,000 displaced people with their skills and qualifications registered on TBB's Talent Catalog. From desk research, we collected a number of key words related to green skills and occupations. An initial search on the Talent Catalog found 4,702 displaced people with **key words*** related to green skills and jobs in their profile. 1,345 people have skills related to "Solar" in their profile, 283 people have skills related to "Carbon" in their profile, and others have skills related to "Renewables", "Biofuels", "Hydrogen" and "Biogas" and other key skills.

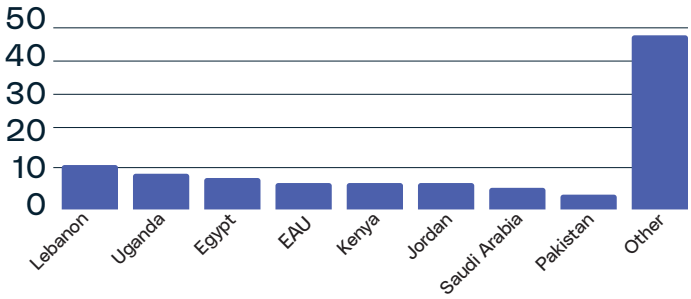
[1] The United Nations Environment Programme (UNEP) also defines green jobs as those in agriculture, manufacturing, research and development, administration or services that contribute substantially to restoring the quality of the environment (UNEP, 2025).

[2] Additional resources from the UK government highlighting the focus on green skills and green energy: The UK's Modern Industrial Strategy (2025), Industrial Strategy Technical Annex (2025), Clean Power 2030 Action Plan (2024), Clean Power 2030 Action Plan Jobs Annex (2024)

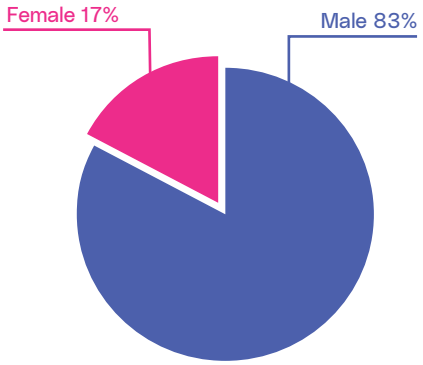
* The list of keywords is provided at the end of this research.

The following **graphics show the demographics and occupations for these 4,702 people:**

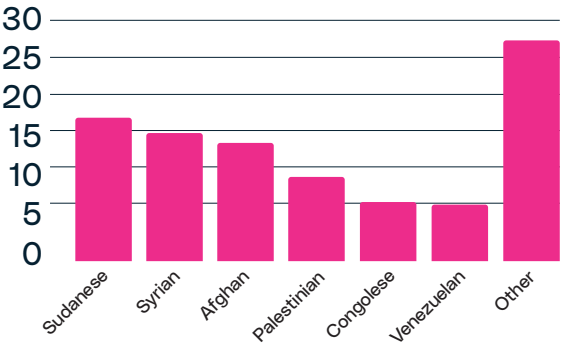
Location %



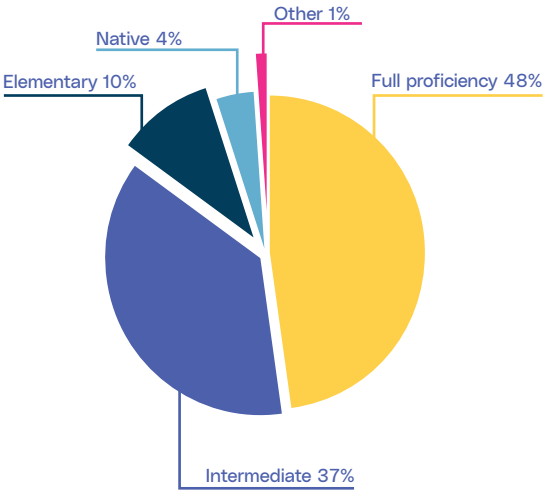
Gender



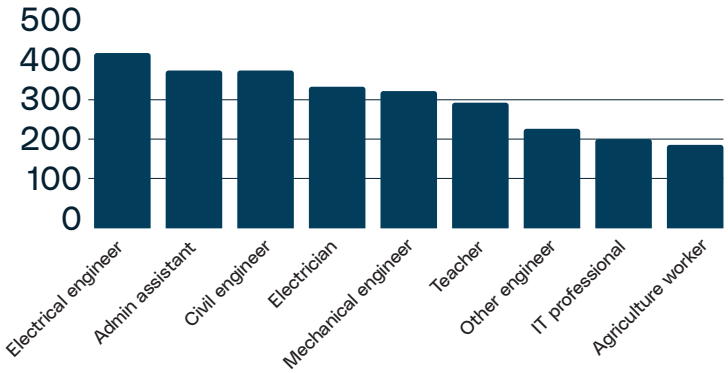
Nationality %



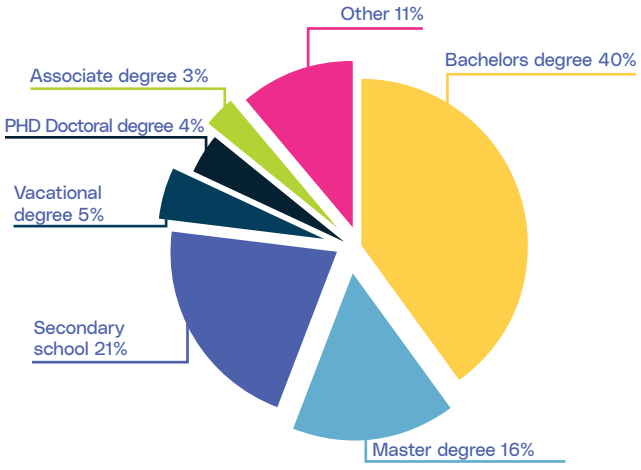
Spoken English Level (self-reported)



Top occupations



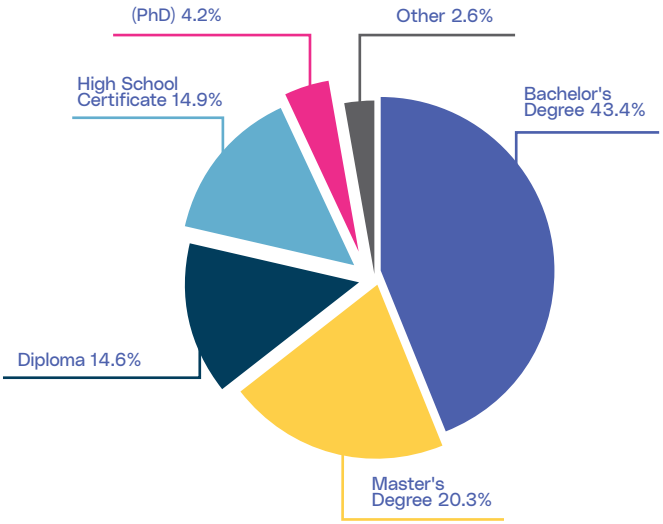
Highest Education Level



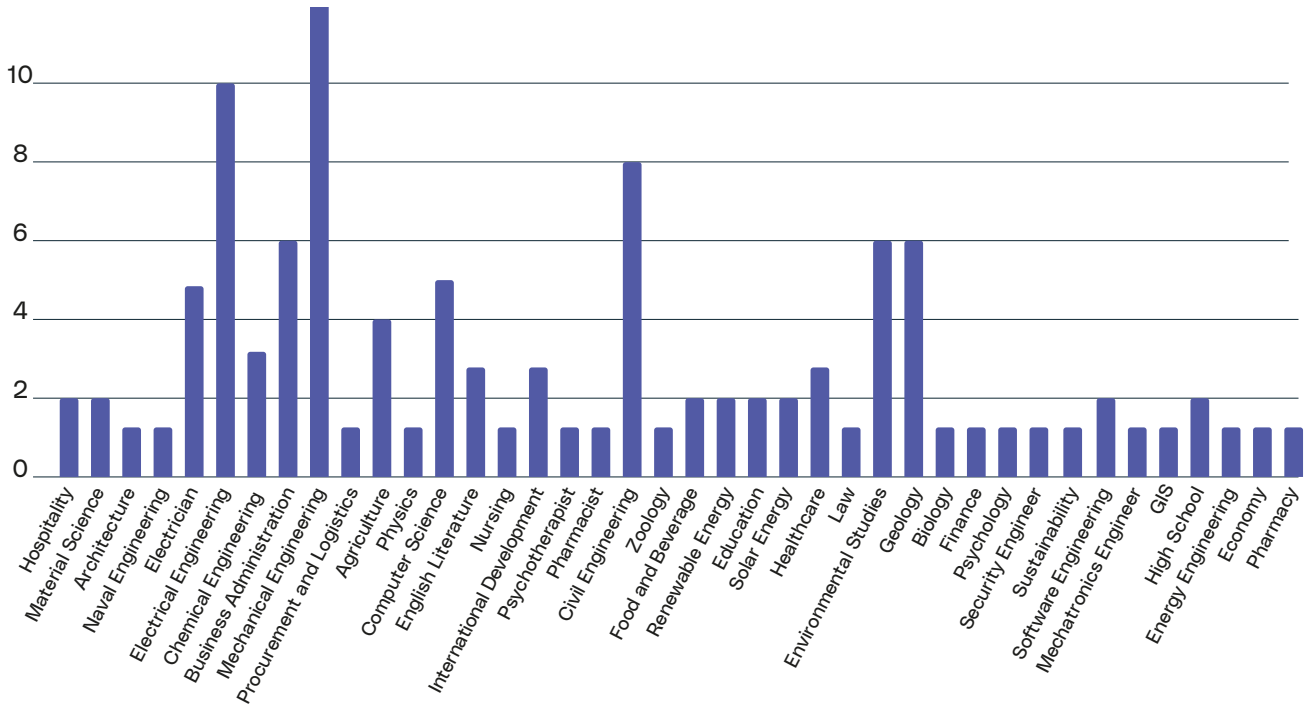
Survey with refugees on the Talent Catalog:

We also sent a survey to 400 people in this sample to understand more about the skills and barriers to employment refugees face in the green energy sector. **116 displaced individuals with experience** in green skills/ energy responded and several key findings were identified. The respondents, 69% male and 31% female, had an average of seven years of experience in their field. 32% were currently working in a job related to "renewable energy", "green skills" or "green energy", and 50% had received some form of green skills training.

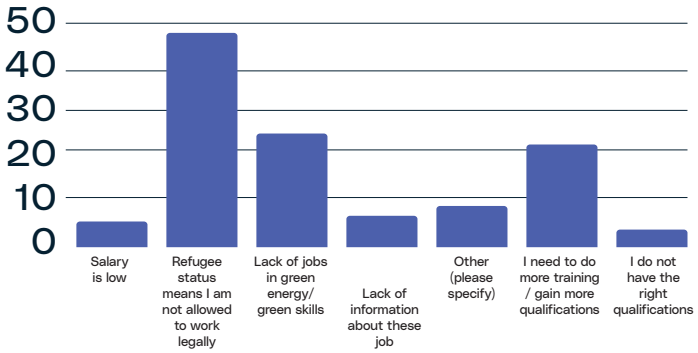
What are your highest academic/vocational qualifications?



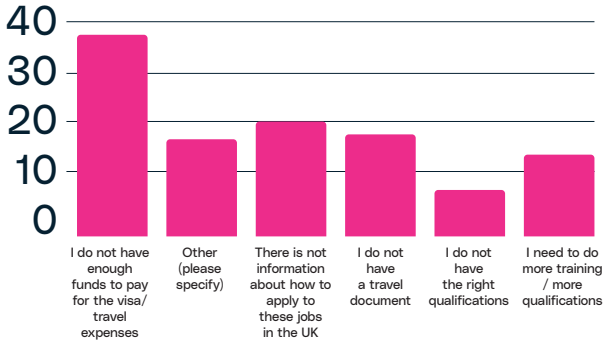
What is the title of your highest qualification?



What do you think are the barriers to you working in green skills in your current location?



What do you think are the barriers to you working in green skills in the UK?



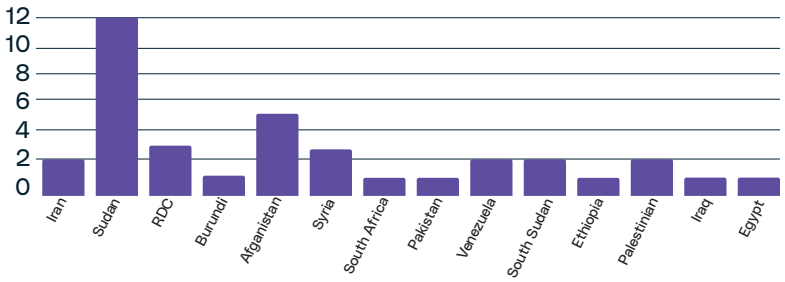
The primary obstacle for refugees to work in green skills in their host country was their refugee status, which often prevents legal employment or restricts individuals to low-skilled jobs. Discrimination and lack of professional networks were also significant barriers. One respondent noted, "*As a Palestinian refugee, I can't register in the Order of Engineers, which limits my work generally (lower salary, working only under supervision of a sponsor which restricts expanding my career further)*", and another commented "*Afghan refugees and immigrants are only permitted to work in casual or low-skilled jobs in my current location*". One respondent also commented that in their host country "understanding of the green energy culture is poor". Discrimination and needing personal connections were also cited as additional barriers for refugees to find jobs in host countries. For the 15% of respondents who had applied for jobs in the UK, the main challenges for finding a job and moving were a lack of funding, not having a travel document, and difficulty finding information about the application process and jobs. Many reported receiving no feedback after applying, and one highlighted:

"Although I was shortlisted and engaged in serious preparation for the roles, I ultimately faced systemic barriers related to work authorization, relocation support, and recognition of international credentials".

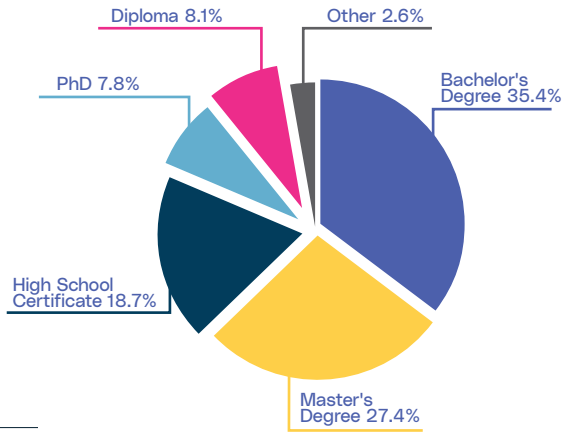
Another responded they were not shortlisted due to "No work experience, and big unemployment gap", which is common for refugees due to their restricted work rights in host countries. Female refugees face additional hurdles, with 43% of female respondents reporting they had experienced barriers to working in their field due to their gender. This includes a preference for companies to hire men, as well as being sidelined due to subjective dress codes or being restricted from working with male colleagues.

The charts below show the **demographics and qualification of female refugees** who responded to the survey:

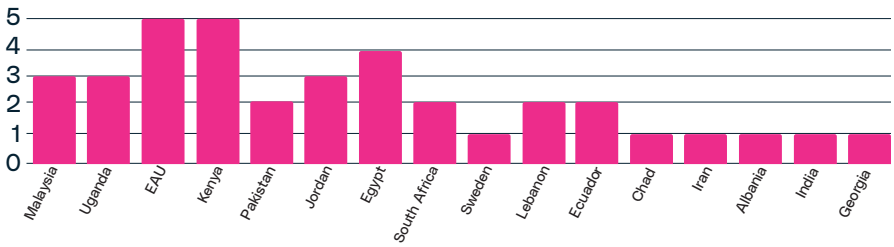
Nationality



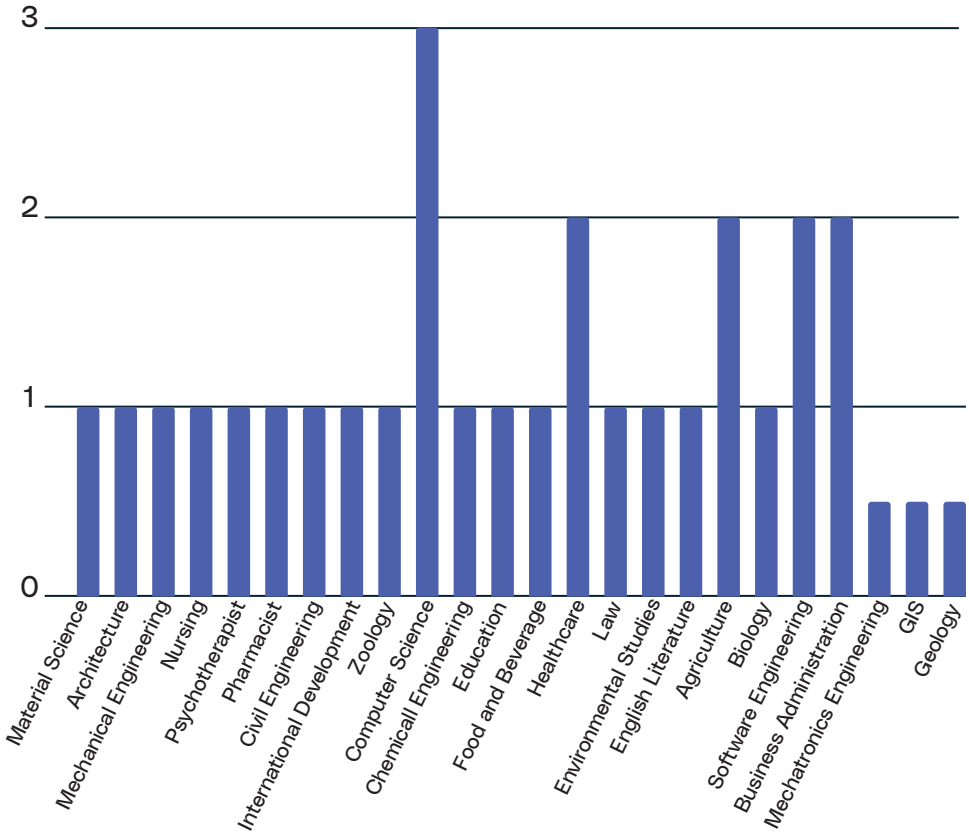
What are your highest academic/vocational qualifications?



Location



What is the title of your highest qualification?



One respondent said *"I have experienced gender-based barriers while working in my field in Iran. Despite having strong qualifications and a successful work record, there were times when I was sidelined due to non-professional reasons such as my appearance or clothing, which were judged based on subjective interpretations of dress codes...I was discouraged or even restricted from working closely with male colleagues, regardless of my competence or the project's needs. These limitations often made it difficult to fully contribute or grow in my role, and they had nothing to do with my actual abilities or performance. These experiences have made me even more motivated to work in environments where professionalism, equality, and merit are truly valued."*

Additionally, Afghan women highlighted women are not allowed to work in Afghanistan at all.

Another respondent noted the discrimination she faces working in computer science: *"I've received comments like, 'Can you even understand this?' or 'Are you sure you can do this job?' and even heard 'this field isn't meant for females'...We continue to face challenges such as being paid less or being unfairly compared to our male counterparts."*

Other challenges include the lack of facilities for women, an expectation for women to stay at home, and a prejudice against women's abilities. For example, one respondent working with solar panels said *"Most people in our community think a female person can't properly work in installing and maintaining the solar panels".*

Another respondent changed careers due to this prejudice against women: *"When I was in Sudan I was trying to have a job in my field as geological engineer but they were not accepting females as they can not be sent abroad to do the field work, hence I started to get a safety certificate... I accomplished it but no one was accepting females, so after being frustrated I made a career shift to be a back office banker"*.

These experiences highlight the challenges and barriers women face working in green skills while living in displacement, and also accessing international job opportunities.

Train-to-hire models in particular could help women to overcome these barriers and also move to societies that could be more accepting of women working in green skill occupations.

Roundtables and discussions with policy makers:

In May 2025, TBB attended the All Energy conference in Aberdeen. Scotland's Deputy First Minister, Kate Forbes, highlighted the country's progress toward net-zero, stating it is halfway there. A central theme of her address was the critical importance of green job creation and the need for a highly skilled workforce. She emphasized that Scotland possesses significant technical expertise and is an attractive location for international talent to fill any skills gaps

Forbes explicitly stated reaching net-zero is impossible without these skilled workers. A key point of her talk was the strong collaboration between the Scottish and UK governments on energy transition and the belief that local communities should be the primary beneficiaries of this shift.

In a video address, Michael Shanks, the UK Energy Minister, confirmed "Great British Energy," a publicly owned company, is now operational and headquartered in Aberdeen. He acknowledged the anticipated move away from the oil and gas industry in the region and stated a key priority is to transition that existing workforce to the clean energy sector.

Representatives from employers also attended the conference. They felt the next five years require radical changes to meet targets, particularly for electric heat and water, which is a major focus for the UK and can help drive consumer buy-in. **There are confirmed shortages of electrical, mechanical, and power engineers.**

In the past year, Siemens has employed over 1,000 people in green energy. The Group Chief Executive for Energy & Utility Skills noted half their engineers are from overseas. For Scottish Power, two-thirds of their business will be in transmission and distribution networks, and they plan to double their workforce in this area.

They believe the industry's opportunities are not well understood, and the UK as a country lacks the necessary skills, so want to collaborate with the UK government on this. To tackle the skills gap, they are focused on apprenticeships, graduate programs, and reskilling and upskilling their current employees and building an early pipeline of talent through local community programs, like work experience opportunities. Overall, employers felt the industry has an aging workforce and struggles to attract local students. **There is a general lack of awareness and appreciation for the industry and the career opportunities it offers, which hinders recruitment.** High visa costs make it difficult for organizations to bring in talent from overseas, even for companies that already have an international presence.

The conference also hosted a session specifically about women working green skills in the UK. While there is a focus on increasing the number of women in the workforce, the experts felt a broader approach to diversity is needed. A specific pipeline issue exists for women entering this workforce. Current efforts to address these problems are often done in silos, lacking a concerted, collaborative approach. To overcome these challenges, a strong sense of purpose is needed, as emphasized by a quote from Jonathan Cole, Chair of the Global Wind Energy Council: "*Believe in what we're doing and why we're doing it. Embed in our companies the right culture so it's part of the DNA.*" The industry needs to focus on educational programs for young people, who are increasingly "purpose-led" and require more than just a job. A more effective strategy involves collaboration between industries and universities to create targeted solutions.

Green skills employer and professionals in the UK

In September 2023, an energy industry employer in Scotland hired a mechanical engineer and an electrical engineer from Syria, who were living in displacement in Lebanon and Turkey. The employer, seeking to fill local skills shortages, used TBB to recruit the skilled refugees. Both engineers started in September 2023, with their families joining them in Scotland a few months later.

DA survey sent to the employer within the first year of arrival showed they were satisfied with the new hire's technical and soft skills, rating one as above average and the other as satisfactory. The employer also felt they adapted well to their new team and organisation. The company found several benefits, including a morale boost for existing staff, positive public relations, and the successful testing of a new talent sourcing strategy. However, the employer noted the cost of hiring from abroad and the long immigration timelines were significant barriers. They expressed a desire for more clarity on the immigration process.

Overall, the employer was satisfied with the experience and is "somewhat likely" to hire displaced talent again. For the engineers, the move to the UK was driven by a desire for safety, legal employment, and a better future for their families. Both had been living in displacement for 9 years, where they were unable to work legally. One respondent noted their experience trying to apply for jobs abroad previously "*I have tried to apply for jobs in Canada, USA, the Gulf, in order to have the opportunity to work and live away from wars...Many of the international companies I applied to were scheduled for a job interview, and the first question was 'where do you live?', They immediately apologized and ended the interview after answering*".

They also shared they had experienced racism and discrimination for being Syrian while living in displacement.

They both felt positive about their new life in the UK after six months, noting an improved quality of life and job satisfaction. The biggest challenges they faced in the UK were adapting to a new work system and getting used to their colleagues' Scottish accents. However they felt the work itself was similar to their work in Syria and their host country. To support their families abroad, one engineer sends home remittances of $500 USD per month, while the other sends $100 USD. Their families use this for basic needs such as food, rent and medication.

In this case, skills and qualifications were not the bottleneck for these professionals to be hired. The barriers were their refugee status, discrimination in the host country, lack of visibility to international employers, and expensive immigration processes for the employer.

3.6.4 Conclusions

Establish a Train-to-Hire Ecosystem[3] consisting of a number of stakeholders, including:

- Employers to hire refugees, co-fund and support projects;
- UK government to create initiatives, provide funding and enable policy settings;
- training bodies (e.g German Energy Academy in Jordan) to upskill candidates in host countries or online;
- regulators and licensing bodies to streamline registration to operate at comparable national levels;
- funders to finance the development of this work which has potential to scale.

Also consider including country nationals e.g. Jordanians in Jordan, in training to encourage investment from host governments.

Understand and Forecast UK Skills Gap through a consortium of employers in the UK's energy sector working with TBB and other labour mobility partners (e.g. UNHCR) to identify current skills gaps and anticipate future needs. Data could inform training programs, ensuring refugees are being prepared for jobs most needed to meet the UK's net-zero by 2050 target.

Support Refugees to Overcome Barriers through TBB working with the UK government, employers and partners to provide targeted support to help refugees overcome significant hurdles they face. Energy sector industry groups could be involved to provide more support specifically for green energy professionals. This includes funding for training and travel, support for securing travel documents and visibility by connecting skilled refugees with employers.

Increase Investment in English Language Training for Refugees from the UK government, green energy employers and industry groups. This is crucial for refugees who already have relevant green skills but need to improve their language proficiency to be competitive in the international job market.

Invest in Training for Refugees, Especially Women. Partners in host countries could work with UK employers, industry groups and education providers to develop specific training and outreach programs for refugee women who have qualifications and skills in green energy. This aims to address the additional gender-based barriers they face in the workforce. Also work with industry leaders to have a collaborative approach to engaging women in the sector

Increase Scholarships for Green Skills. Universities and technical colleges in host countries and the UK work with employers and industry groups to provide more scholarships for refugees to pursue qualifications and training in green skills. This would help fill skills gaps in the UK while providing a path to a better future for displaced individuals.

[3] In wider academic research, Dahlberg et al. (2022) demonstrated through a randomized controlled trial in Sweden that early, intensive labor market interventions (particularly language and technical training) for refugees can increase employment rates by approximately 15 % - highlighting the potential efficacy of a "train-to-hire" model (Dahlberg, Egebark, Özcan, & Vikman, 2022).

Support Integration of Refugee Employees and Families. TBB and integration partners in the UK (e.g. Reset) work with employers to help refugee employees and their families integrate into their new lives. This support could include providing temporary accommodation, helping find schools, and setting up a buddy system to help them acclimate to their new work and social environments.

Make International Hiring More Attractive to UK Employers, by advocating for the UK government to lower costs and streamline immigration processes. Also ensuring visa pathways are open and accessible for refugees and displaced people, as discussed in the Governments Immigration White Paper released in May 2025[4].

[4] Restoring Control over the Immigration System (UK Government, May 2025)

*Key words used to find talent in the Talent Catalog:

Renewables
Biofuels
Solar
Wind recycling
"Circular economy"
Waste Sustainability
Biodiversity
Hydrogen
Carbon
Solar
Biogas
Bioassay "Soil sampling"
Permaculture
"Sustainability Specialist"
"Sustainability Analyst"
"Sustainability Coordinator"
"Heat pump"
"Wind turbine"
"Electric car"

Longer list of green skills occupations in demand (LinkedIn report, 2024):

Climate action planning
Sustainability education
Carbon emissions
Carbon accounting
Corporate sustainability
Hydrogen storage
Hydrogen fuel cells
Carbon capture
Green IT
Sustainability reporting
Solar system design
Ecosystem management
Impact assessment
Sustainable transport
Solar industry
Biogas
Sustainable procurement
Bioassay
Soil sampling
Permaculture
Renewables
Biofuels
Wind
Recycling
Circular economy
Waste
Sustainability
Biodiversity

3.6.5 Biography

Sarah Walder is the Global Monitoring and Evaluation (M&E) Lead for non-profit organization Talent Beyond Boundaries.

TBB focuses on refugee labour mobility as a complementary solution to traditional humanitarian resettlement and connects skilled refugees with companies in need of their skills while working with partners to help facilitate their recruitment, migration and settlement. Before working for TBB, Sarah completed a Mathematics BSc degree from the University of Bath in 2016 and an MSc in Development studies from SOAS University of London. Sarah joined TBB as a volunteer in 2020 working on the first UK programmes to support displaced nurses to move to the UK. She became UK Project Officer at the end of 2020 before moving into the role of UK and Europe Monitoring & Evaluation (M&E) lead at the end of 2021. She was promoted to Global M&E Lead at the beginning of 2024. In her role as Global M&E Lead for TBB, she is responsible for collecting and analyzing data to measure the impacts of TBB's global programmes, and collecting feedback through surveys and qualitative interviews from stakeholders. This supports TBB to improve programmes and processes, and understand challenges and opportunities for refugee labour mobility pathways.

3.7 Industrial districts: what is needed to become circular, green and inclusive

NeXt, Nuova Economia per tutti (New Economy for All)

3.7.1 Abstract and scope of the research

The research has three complementary objectives. The first is to define a *concept*– that is, a frame of reference–for Green and Inclusive, Circular Industrial Districts (ICGI) and a related set of criteria and indicators. The concept consists of five capitals, namely cultural, human, social, environmental, and economic, which guide the development and formation of ICGI districts. The second objective is to investigate the green professions and skills that are useful for fostering the competitiveness of the districts and their sustainable transition towards the *concept*. The third objective is to explore how targeted and inclusive training courses can help bridge the *mismatch* between labor supply and demand in order to enhance skills, particularly for migrants.

3.7.2 Methodology

The research is divided into four phases, each of which is supported by specific methodologies.

1. *Concept* construction: a review of the literature on industrial districts was conducted in order to define the components of the ICGI Districts *concept* and its indicators;
2. Descriptive statistical analysis: using descriptive and correlational statistical techniques, the relationships between elementary indicators (i.e., simple static measures that describe a single aspect of the phenomenon under investigation) and composite indicators (a combination of elementary indicators in a single measure) of the *concept* referred to in the previous point were tested, as well as the correlation with the territorial concentration of districts, migrants, and ISTAT indicators of equitable and sustainable well-being;
3. Mapping of *green* skills: a review of the literature on the *green* job market and an analysis of the ESCO database were carried out to identify the *green* professions and skills relevant to the development of ICGI districts and thus guide the training and inclusion pathways for migrants;
4. Qualitative survey: through focused interviews with experts in local and circular economics, migration, training, and the business world, the hypotheses underlying the *concept* were verified in order to identify innovative and applicable educational, inclusive, and labor policies.

3.7.3 Description of the research and main findings

Green and Inclusive, Circular Industrial District

Circular Industrial Districts

Circular districts are advanced industrial economy systems capable of emerging, evolving, declining, and re-emerging by identifying new sources of sustainable and circular value (Bressanelli et al., 2022). In Italy, they are created with the aim of converting declining industrial sites and developing technological hubs capable of transforming plastic waste and industrial scraps into new valuable resources with low environmental impact. The model is based on the creation of integrated supply chains, where the concept of "waste" is replaced by that of "resource," promoting the reduction of emissions and the creation of new local development opportunities.

This is mainly achieved through technologies such as mechanical upcycling, chemical recycling "waste-to-chemicals" (production of circular gas from which hydrogen, methanol, ethanol, and ammonia can be obtained) and the generation of circular and green hydrogen (electrolysis from renewables), from which circular fuels and raw materials are obtained that reduce incineration and landfill. In recent years, a number of Green Circular District projects have been developed.

But how can a district be created and how can it be made circular and inclusive?

Creating a district

A district is *"a social-territorial entity characterized by the active coexistence, in a circumscribed naturalistically and historically determined geographical area, of a community of people and a population of enterprises"* (Becattini, 1987). It is therefore businesses, history, and territory; it is a community that shares a culture and tradition intertwined with the production that characterizes the district (Boschma, 2005; De Marchi & Gradinetti, 2014). It is also, and perhaps above all, specialization of labor and the presence of high human capital and many small and medium-sized businesses that form a relational and fiduciary network capable of transforming knowledge into economic value. A relationship that generates economic synergies, which in turn consolidate relationships and shared identity. This relationship becomes territorial when it enters into symbiosis with local institutions and when these institutions change as business needs evolve. In this sense, the district is already in itself a tool for sustainable development because it seeks and creates synergies with the community and institutions by mapping out a mutually beneficial project that combines long-term common interests with individual businesses.

To understand how the district impacts the environment and inclusivity, we must define the aspects that have value for sustainable development and that will be included alongside economic and cultural aspects to form the reference *concept* together with circularity and inclusion. Only then can we evaluate the territories and identify which trajectories to pursue in order to achieve full economic competitiveness that is circular, *green*, and inclusive.

Concept of the Green and Inclusive, Circular Industrial District

The *concept* of the Green and Inclusive, Circular Industrial District (ICGI) defines a district model capable of combining economic development with environmental and social sustainability through the articulation of five interdependent capitals.

Cultural: includes shared practices, industrial history, and local identity that foster a sense of belonging and active *stakeholder* participation.

Human: concerns the skills, training, and technical-scientific know-how present in the territory, an essential element for the development of *green* professions and continuous innovation.

Social: includes the networks of trust, cooperative relationships, and supporting institutions (*clusters*, business associations, third sector) that facilitate the coordination of actions and participatory *governance*.

Environmental: measures the quality of ecosystems, the availability of natural resources, the presence of protected areas, and the spread of renewable energy infrastructure, which are pillars of the district's circularity.

Economic: assesses the ability to generate value, attract investment, and support shared infrastructure, also considering the level of eco-investments and market opportunities for *green* products.

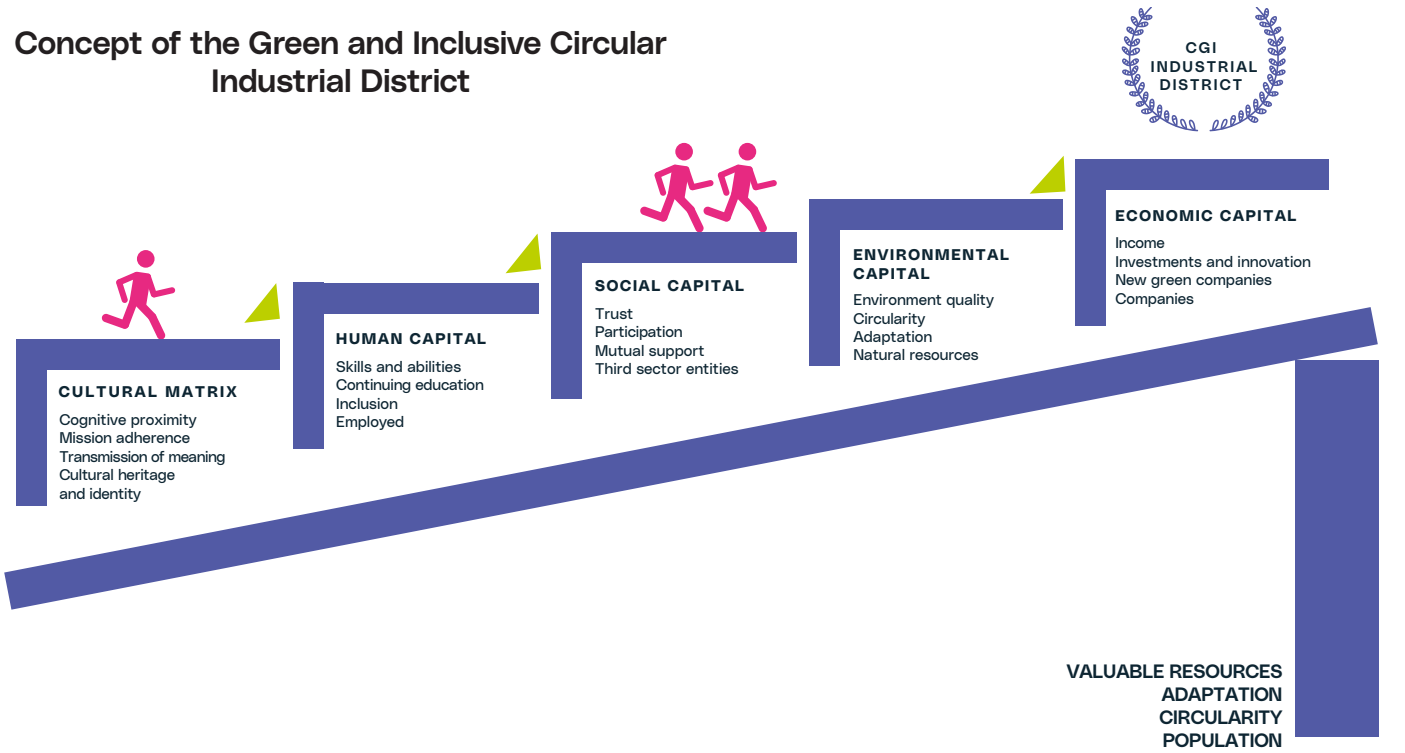


Figure 1. *Concept* of the Green and Inclusive Circular Industrial District. Source: in-house analysis

Indicators and results

Each capital has been associated with indicators that capture its key aspects. The chosen indicators are available at the regional and provincial level and belong to the benessere equo e sostenibile or the just and sustainable well-being (BES) of the ISTAT territories. This selection has been approved by the experts interviewed.[5] [6]

Once the *concept* indicators had been chosen and validated, we were able to assess the proximity of Italian districts to the ICGI concept in Italian regions and provinces. At the regional level, central Italy, Puglia, Sardinia, and South Tyrol stood out for their higher values (closer to being perfectly aligned with the concept), while the provinces that stood out were Rome, Milan, Aosta, Verbano, Trieste, Trento, Bolzano, Florence, Bologna, and Naples.

The main finding is that a greater presence of districts is associated with higher indicators of equitable and sustainable well-being, showing that the industrial district is already in itself a means for sustainable development. However, there is room for improvement. In particular, areas with greater district intensity have worse values in terms of environmental impact, which is partly offset by the ability of these same areas to express greater economic circularity. The ICGI concept can therefore help identify priorities so that districts can fully contribute to sustainable development without neglecting environmental and social aspects.

[5] The composite indicators are calculated using the z-value. The capital product indicator is the product of the composites, each added to the minimum of the composites under the fifth root.
[6] The indicators operate at regional and provincial level and, consequently, have a meso (intermediate) level of detail and are therefore close to that of districts, even though these may have a dimension that falls between provinces or regions. A similar approach has been used in the literature to investigate the same issues (Bellandi et al., 2021), but while comparing the average environmental performance of territories with more and fewer districts, we look at the correlation between the density of Italian districts in the territories to see to what extent the districts are circular, green and inclusive.

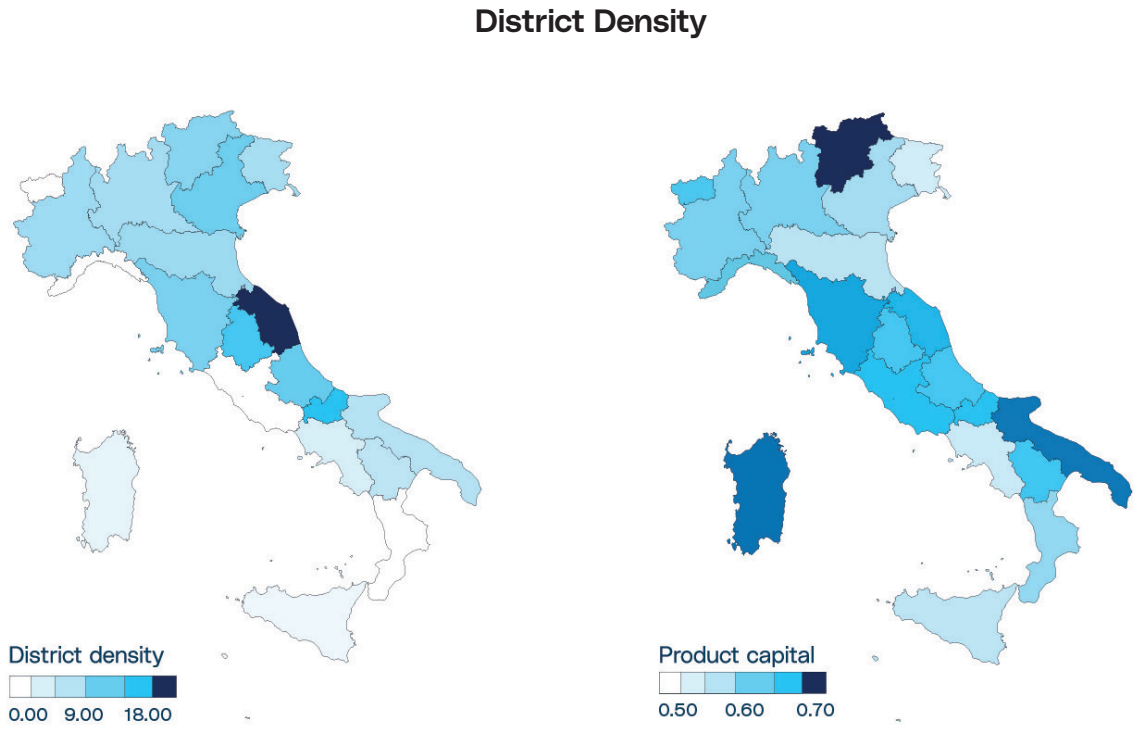


Figure 2. District density (number of inhabitants per districts) (left) and ICGI value (concept product capital) (right). Source: in-house analysis

We extended the previous analysis to migrants. The results suggest that a greater presence of migrants is positively associated with both a higher density of districts and higher values of the concept's capitals (and therefore of the BES). The only exception relates to mutual support, which is also measured by crime indicators.

This suggests that migrants are a resource for the development of districts, ICGI districts,

and for equitable and sustainable development, but that in order to enhance this resource, it is necessary to pay attention to the social pillar, to the mutual support, by implementing policies and pathways for inclusion.

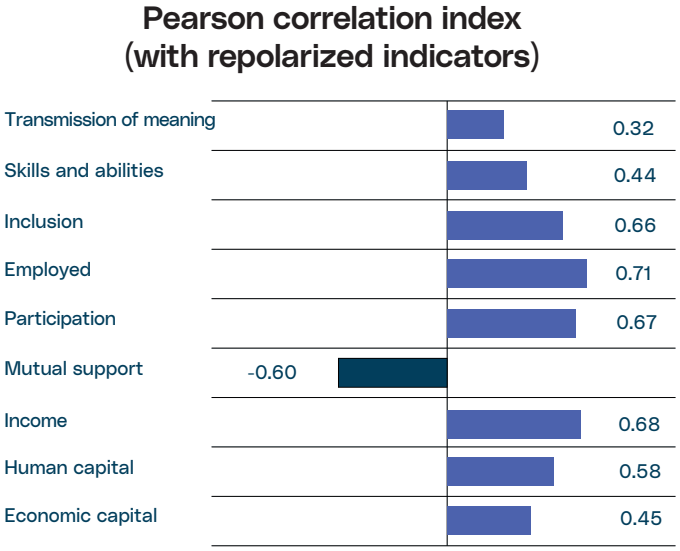


Figure 3. Correlation between migrant density and ICGI concept indicators. A positive value indicates that higher migrant density is associated with an improvement in the ICGI concept indicator, while a negative value indicates a deterioration. Source: in-house analysis

From green jobs to training and inclusion of migrants

Green professions and skills

The district thrives if it is able to attract, include, cultivate, and enhance workers and skills, the human capital in the concept. In order to contribute to inclusive and circular economic development, green professions and skills are particularly necessary, i.e., jobs and skills that produce net positive value in terms of sustainable development (Demerse, 2011). However, attracting or training such skills and professions is a challenge because they are difficult to find in 52.6% of cases and will be even more difficult to find in the future (Symbola & Unioncamere, 2024). This is another reason why attracting and including migrant workers with the right skills becomes strategic.

To help bridge the gap between what the job market needs and what's available, we've compiled a list of hard-to-find green skills and professions from the ESCO database in Tables 2 and 3.7 This list provides guidance for sustainable industrial development policies and for those involved in training and career exploration.

Table 2: Professions with the highest green rating (GR)

Profession	GR
Sustainability Coordinator	181.7
Environmental policy official	165.7
Environmental expert	160.8
Natural resources consultant	159.8
Environmental consultant	159.6
Director of Environmental Protection	157.9
Energy saving technician	154.6
Civil engineering consultant	154.6
Environmental program coordinator	152.9
Distribution engineer	152.1
Mechanical engineering expert	150.5
Energy consultant	149.9
Energy analyst	148.7
Hazardous waste environmental inspector	148.0
Recycling coordinator	147.6
Naturalist	146.5
Forestry consultant	146.3
Energy consultant	146.0
Forest custodian	145.3
Energy manager (sustainability energy manager)	145.0
Environmental control technician	142.8
IThermal plant design engineer	142.7
Environmental guide	141.8
Environmental manager	140.4
Environmental researcher	140.0
Geothermal engineer	139.3
Recycling agent	139.3
Agronomist soil scientist	138.7
Waste management manager	138.7
ISeveso inspector	138.0
Aquaculture technician	137.8
Water monitoring technician	137.0
Solid waste treatment plant operator	136.8
Liquid waste treatment plant operator	136.7
Agricultural production manager	136.6
Manufacturing production manager	135.4
Natural resource conservationist	134.3
Hydrologist	134.0
Horticultural foreman	134.0
Solid urban waste collection worker	133.4
Water resources engineer	132.5
Electrical engineering expert	132.5
Tree care expert (arborist)	132.4
Geothermal systems installer	131.9
Horticultural foreman	131.5
Waste sorter	131.4
Environmental engineer for the waste sector	131.0
Botanist	130.8
Park ranger	130.7
Forest management manager	130.4
Water analysis officer	130.2

[7] The green rating of professions is calculated according to the methodology proposed by ANPAL (2024) using a synthetic index (Mazziotta-Pareto Index) based on the presence of green skills (essential and optional) in professions according to the ESCO database. Similarly, that of skills.

Table 3: Green skills with the highest *green ranking* (GR)

Area	Green skills	GR
Regulations and environmental responsibility	Ensuring compliance with environmental regulations	437.2
	Environmental legislation	321.9
	Corporate social responsibility	315.8
	Health and safety regulations	247.5
	Pollution legislation	209.7
	Environmental policy	205.2
Environmental and waste management	Disposing of non-hazardous waste	198.9
	Managing waste	196.3
	Waste management	189.9
	Disposing of hazardous waste	271.0
	Storage of hazardous waste	184.1
	Disposing of food waste	216.9
	Managing the environmental impact of activities	170.1
	Reducing the environmental impact of footwear production	219.7
	Renewable energy technologies	191.5
Energy, efficiency, and renewables	Energy performance of buildings	227.8
	Energy savings	224.7
	Energy efficiency	204.4
	Electricity consumption	165.3
Environmental analysis, assessment, and monitoring	Analyze environmental data	185.4
	Assess environmental impact	235.1
	Report pollution incidents	176.2
	Monitor the impact of manufacturing	165.6
	Check water quality	165.9

The qualitative inquiry

The ICGI concept and the theme of migrant inclusion and training were the subject of interviews with select witnesses (eight experts): economists, sociologists, training and active labor policy experts, entrepreneurs, and trade unionists. These interviews also made it possible to gather proposals for the development of ICGI districts and for the training and inclusion of migrants.

The survey highlights the need to address the phenomenon of migration in a new way. Migration policies are needed that include both entry facilitation policies (e.g., *click day*), designed to meet actual labor demand without excessive bureaucratic complexity and an uncertain outcome, as well as integration measures (e.g., linguistic, cultural, housing, *welfare*) aimed at avoiding ghettoization.

Critical issues emerge that hinder the processes of social and work inclusion, which must be addressed with actions aimed at promoting decent, contractual work free from exploitation, in order to guarantee dignity and rights for migrant workers and build social participation, an essential element of real inclusion. In this sense, it is essential that migrants feel they are an integral part of society and have equal access to education, employment, healthcare, and housing. The proposed actions focus on combating undeclared and illegal employment of immigrants and on involving companies in the selection process while avoiding generic quotas.

The issue of recognizing and developing the *green* skills of migrants both in Italy and before their arrival also emerges. It is important to recognize and value the skills, including informal ones, possessed by migrants, as well as to offer internships, apprenticeships, and stable contracts to promote innovation and sustainability.

Vocational training is extolled as a powerful tool for inclusion, not only for migrants.

People who attend training courses integrate more easily. Training is also a vehicle for emancipation, community, dignity, and participation, as well as helping to increase employment by reducing the gap between the skills required by companies and those possessed by citizens and migrants.

The ICGI *concept* has been recognized by the same group of experts as a useful tool for rationalizing what emerges, without yet being formalized, in the networks of relationships between companies, suppliers, and customers. For this reason, the concept is proposed as a basis for further research aimed at collecting and systematizing experiences and best practices, so as to more effectively guide political and economic choices, both at the industrial level and at the level of individual communities and companies.

This *concept* requires that its assets manifest themselves in a specific territory and, for this very reason, cannot be imposed from above: it requires the recognition and contribution of local actors and their traditions. In this perspective, culture, inclusion, and the environment become fundamental elements which, when clarified and enhanced, favor the development of the districts and the communities that comprise them.

3.7.4 Conclusions

The *concept* of *Green* and Inclusive, Circular Industrial Districts (ICGI) offers a clear framework for combining economic development, sustainability, and social cohesion through five interdependent capitals: cultural, human, social, environmental, and economic.

The research highlighted three main findings:

1. **Districts and well-being** – a greater presence of districts is associated with higher BES indicator values, confirming the district as a lever for sustainable development;
2. **Environmental criticalities** – the most productive territories suffer from worse environmental conditions, but the ICGI concept allows priorities to be identified to improve ecological quality and competitiveness;
3. **Inclusion and *green* skills** – the presence of migrants correlates positively with the concept's capital, provided that inclusion and training programs are activated, especially in the green skills that are most in demand and difficult to find today.

In conclusion, the ICGI concept is proposed as a model and operational tool to guide policies, training, and investments, transforming industrial districts into laboratories of sustainable and inclusive innovation.

3.7.5 Biography

NeXt – Nuova Economia per Tutti (New Economy for All) is an association founded in Rome in 2011 that aims to promote a civil, participatory, and sustainable economic model, focusing on the common good.

Demetrio Miroslavo Bova is a postdoctoral researcher in Economics and Finance at the University of Rome Tor Vergata and, and since 2025, a professor of descriptive statistics at the Pontifical Salesian University. His work focuses on sustainable development, well-being indicators, and public policy, using an approach based on economic and statistical models. He has collaborated with academic institutions and research centers such as CMCC, Ca' Foscari, the University of Florence, and the University of Warsaw. His studies focus on the circular economy, ESG sustainability, and territorial generativity. He collaborates with NeXt – Nuova Economia per Tutti (New Economy for All) as a researcher at the Center for Studies and Evaluations (CeSVa).

Fabio Cucculelli is a short-term contract researcher at the University of Rome Tor Vergata. Since 2000, he has worked at the national ACLI (Christian Workers' Association), holding various positions including: the Research Office, the Department of Thought and Politics, the Employment Area, and the Institution and the Department of Institutions and Family. Since 2006, he has collaborated with the magazine “La Società” of the Fondazione Toniolo in Verona. From 2016 to 2021, he collaborated with the Study Center of Italian Catholic Action, and from 2019 to 2022, he was a professor of Sociology of Work at the Department of Education Sciences at Guglielmo Marconi University in Rome. Since June 2022, he has been collaborating with the Center for Studies and Evaluations of NeXt Economia.

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3.8 The perspective of migrants: expectations, barriers and strategies in the processes of work inclusion

Fondazione AVSI - ETS

3.8.1 Abstract and scope of the research

The research, conducted by the AVSI for Community Center (Centro AVSI for Community) as part of the project "Migration Flows and Energy Transition" (Flussi migratori e transizione energetica) funded by the Fondazione MAIRE - ETS, investigates the training and job placement experiences of migrants in Italy, starting from their own perspective. It also investigates the participants' interest in potential training and involvement in supply chains that promote energy transition. The study adopts a qualitative phenomenological approach involving Arabic-, Spanish-, and Ukrainian-speaking migrants in contact with the Center between January 2024 and January 2025, through five (5) Focus Group Discussions (FGDs). Two (2) semi-structured interviews were also conducted with experts from partner organizations providing training services. The analysis carried out using ATLAS.ti software, revealed systemic barriers to accessing work placement: language barriers, lack of recognition of qualifications, limited specialization of the available opportunities, and an ineffective connection between training and labour market demand. However, positive signs also emerged: interest in green employment, motivation to pursue training, and a desire to contribute to local development. The results underline the urgent need to design accessible, professional, and flexible training opportunities that are consistent with the profiles of migrants and the needs of the job market. The research offers concrete insights for rethinking training programs to promote labour market integration through an inclusive and sustainable approach.

3.8.2 Methodology

The research adopted a qualitative approach, using a phenomenological study to investigate participants' experiences in training programmes designed to support labour market integration, as well as their perspectives on these experiences.

The population of interest, which belongs to the Hispanic, Arabic, and Ukrainian linguistic groups, refers to a group of two hundred and nine (209) migrants who contacted and were assisted by the AVSI Center for Community between January 2024 and January 2025. Thirty-six (36) participants, including twenty-two (22) women, took part in the data collection through five (5) focus group discussions, held in person at the AVSI for Community premises with the support of an interpreter. The data collection also included two (2) semi-structured interviews conducted with providers of training modules from partner organizations.

The data was collected in compliance with ethical considerations and with respect for the rights and dignity of the participants, through the collection of informed consent from each participant. The confidentiality of the information shared is guaranteed in accordance with the privacy policy of Fondazione AVSI-ETS. A shopping voucher worth €20 was distributed to participants of the focus group discussions as a token of appreciation for their time and contribution to the research. The thematic analysis of the data, disaggregated by gender, was carried out using the ATLAS.ti software.

3.8.3 Description of the research and main findings

AVSI for Community

AVSI for Community was born out of an initiative launched by Fondazione AVSI - ETS just a few weeks after the outbreak of the Ukrainian conflict in February 2022 in support of Ukrainian refugees. It is a multi-service center that serves as a space for proximity and listening, aimed at supporting pathways towards integration and autonomy for migrants and vulnerable individuals.

It is also a place for eco-design, which values inclusive partnerships and promotes open and welcoming communities. The Center is part of a territorial network involving institutions, companies, and associations, adopting a multi-stakeholder approach that brings together different players, perspectives, and resources to design and implement shared and complementary solutions.

The main activities of the AVSI for Community Center in the period from January 2023 to January 2025 were as follows:

Listening, guidance, and support

Over 12,940 people supported: requests received at the reception desk, by telephone, by email, and through referrals from other agencies, mainly for document support, guidance and job placement, Italian language courses, and reception/housing solutions.

Listening, guidance, and support

- 11.344 requests handled for documentation support;
- 4.741 interviews for consultation and initiation of documentation procedures;
- 3.869 appointments made at the police headquarters and local police stations.

Personal development: employment and training

- 115 participants in Italian language courses;
- 457 people enrolled in guidance, training, and job placement programs;
- 46 companies/organizations made aware of the issue and involved;
- 1.579 children and adolescents enrolled in school and extracurricular activities.

A distinctive element of the AVSI methodology is its approach to the individual as a person with expectations and desires, and as the protagonist of their own path towards inclusion and integration. The Center has built its processes of accompanying people into the workforce based on this premise.

AVSI for Community is part of the Fondazione MAIRE - ETS research project as a center that hosts training initiatives and employment integration programs. Grounded in the lived experiences of migrants and the employment barriers they encounter, the study investigated the perspectives of migrant people, revealing how they are often excluded from certain labour supply chains, which fail **to recognize their potential and consider them as resources and value catalysts.**

The research offers reflections that may help inform decisions regarding the design of training and employment integration pathways for migrants in the industrial and service sectors related to energy efficiency, decarbonization, and waste recycling, which are of interest to the Fondazione MAIRE – ETS.

Results

Specific Objective 1: To investigate migrants' perspectives regarding their experiences with training opportunities and employment integration

The analysis, disaggregated by gender, was conducted on a sample of 36 participants, heterogeneous in age, cultural background, and migration trajectories. Data collection saw a strong female participation (75%), influenced in particular by the nature of the migration experience of the Ukrainian group, which took part in the study to a greater extent. Particpants' ages were also diverse: the majority (58%) feel within the 26-59 age group, one quarter were between 25 and 35 years old, while a smaller proportion consisted of individuals aged between 19 and 24 years old and over 60. Despite this diversity, participants reported common experiences with regard to difficulties in accessing the labor market. The main challenges that emerged concern language barriers, the mismatch between existing skills and available professional opportunities, the limited effectiveness of available training pathways, and the lack of opportunities for specialization.

Obstacles and critical issues in job placement

Language barriers

One of the most commonly reported obstacles concerns language proficiency. This limitation deeply affects the ability to navigate the labor market, access qualified roles, and make use of one's educational background. Even those who demonstrated functional communication skills in Italian or English reported instances episodes of workplace exclusion linked to employers' perception of an inadequate level of language proficiency. The language training courses offered at the AVSI for Community Center, which integrate language teaching with the technical terminology relevant to the specific work context, are therefore particularly relevant.

Mismatch between qualifications and professional opportunities

Many participants, despite holding academic degrees or advanced technical skills, find themselves performing low-skilled jobs in sectors unrelated to their career path and educational background. Forced deskilling represents a source of frustration and a missed opportunity for the system to acquire human capital.

"There are many of us who have a university degree, yet here we often find ourselves having to set it aside. It's as if we have to forget that we are qualified." FGD Ukrainians 1

Participants identified the causes as systemic barriers (e.g., lack of recognition of qualifications) and the poor match between local training provision and the professional profiles of migrants.

Specific objective 2: To assess the participants' interest in training and engagement in supply chains that are functional to the promotion of the energy transition

Considerations regarding the critical issues related to training courses emerged. Such insights help rethink how to best structure and promote training initiatives so that the proposal is part of a large-scale project that provides an opportunity for personal and professional growth for vulnerable individuals, for whom it is necessary to pay close attention to the terms of the proposals and the concrete nature of the opportunities.

Interest in *green* employment

Familiarity with the topic of energy transition and gender perceptions on the sector

Most participants showed limited knowledge of the energy transition sector. A stereotypical view of the sector as a predominantly male -oriented field of work also emerged, with a widespread perception that women being excluded from energy-related professional pathways.

Interest in working in the sector

A minority of participants, already aware of the topic, showed an active interest in the energy field, appreciating its ethical and technological aspects.

Although most of the respondents expressed their intention to remain in Italy permanently, some – especially among the Ukrainian respondents – expressed an interest driven by a desire to gain experience and grow in a sector as an opportunity for reconstruction and future development in their home country.

"Studying these issues today may be useful to us tomorrow. When we return to Ukraine, we will be able to contribute to the reconstruction. There will be a need for people who know the sector. It is an opportunity for the future." [FGD Ucraini 1]

Finally, most participants, although unfamiliar with the sector, expressed curiosity and willingness to gain experience in it, provided that the conditions of the offer met their needs.

Training courses

Lack of employment-oriented planning

Another critical issue concerns the training offer, which is often perceived as fragmented and disconnected from real employment needs. The courses attended, although formally aimed at job placement, are rarely accompanied by concrete employment opportunities as they are not part of an integrated pathway that structurally links training, support, and labour demand.

"Attending a course is not enough. Afterwards, when you try to find a job, many are not willing to hire you. The connection between training and employment is often non-existent." (FGD Ucraini 2)

Limited specialization of training offers

During the group discussions, the perception of a lack of specialization in many training programs was reported. The excessive generality of the courses does not provide a real competitive advantage in job searching and risks contributing to professional marginalization. Some participants pointed out that the only truly professional training courses require payments, making them inaccessible to those in precarious economic conditions.

"Many training courses are too generic. The ones that are really useful require payment, but if you don't have a job, you can't afford them." (FGD Ucraini 3)

There is a strong demand for professional training pathways that are consistent with individuals' previous education allowing them to make use of the skills acquired in their country of origin.

Participantion and relevance of the training offer

The participants expressed general difficulty in attending training courses, which were often considered incompatible with their work and family needs. Interest in training was detected, nonetheless effective uptake was reported to conditional upon the concrete possibility of it being compatible with their current job and of the prospect of real professional placement after training.

Many migrants precarious work, which makes it difficult to attend courses with fixed schedules. When job opportunities arise, even temporary ones, training becomes secondary, especially when it is not clearly linked to an opportunity for future employment.

“Everyone has their own responsibilities and needs (...). I can't start over (...), but I'm willing to devote a few hours two days a week to learning something new or figuring out if it's right for me. But if I started over, my debts would pile up. If I quit my job today, what would I do? I'd have to take out loans, and I can't do that.” (FGD Arabs, PM2)

Greater adaptation of the training offer is called for: evening or weekend hours, short and targeted courses, to allow participation without compromising income.

3.8.4 Conclusions

The survey conducted as part of the research project "Migration Flows and Energy Transition" funded by the Fondazione MAIRE - ETS, identifies points of interest regarding the acquisition of knowledge on the ways in which migrants are trained and integrated into the workforce.

Based on the experience and perspectives of people with migrantion *background*, the study highlights some critical systemic issues that hinder the labour placement of such individuals, even when they have the necessary skills, motivation, and availability. Language barriers, lack of recognition of professional and academic qualifications, misaligned and inaccessible training opportunities, as well as poor connection between training and actual labor demand, are recurring factors of exclusion and marginalization.

At the same time, positive elements emerged: interest in the energy sector, willingness to undergo training, and a desire to contribute both to their current environment and, in the future, to their country of origin.

This findings suggest the need to rethink training pathways in an integrated and flexible manner, through accessible, professionalizing programs that are aligned with the market needs and the skills of the beneficiaries. The study emphasizes that for training to truly become a real lever for inclusion and empowerment, it is essential that it is connected to concrete employment opportunities and that training *curricula* are developed ad hoc to meet these objectives.

3.8.5 Biography

AVSI Foundation is a civil society organization that has been implementing development cooperation and humanitarian aid projects since 1972, with a specific focus on education, intended to accompany individuals in the discovery of who they are and their relationship with others.

In 2024, it operated in 41 countries, reaching over 4 million direct beneficiaries through 300 projects. The main areas of intervention include education, agriculture and food security, energy, the environment, economic empowerment, vocational training, and employment.

Sofia Geleng is a researcher and impact evaluator. She has operated in development and humanitarian contexts in East Africa, conducting qualitative studies on education, protection, and on the prevention of gender-based violence. She is currently engaged in applied social research in Italy.

Veronica Guidotti is a *project manager* for the Fondazione AVSI, focusing on migration and education matters. She is the coordinator of the AVSI for Community multi-service center in Milan and collaborates with the University Bicocca of Milan on the development of services for the academic integration of refugee students.

FONDAZIONE MAIRE

CONCLUSIONS

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4. Towards a MAIRE project for the training and work inclusion of migrants

Franco Ghiringhelli
Group Human Resources, ICT, Organization & Procurement, Senior Vice President, MAIRE.

The energy transition is among the most complex and decisive challenges of our time.

It is not just a technological transformation, but a profound change in production models, social behaviors, and skills required. In this scenario, human capital becomes the real driver of change. The ability to attract, develop, and enhance new and diversified skills is the key to making the transition not only possible but also just and sustainable.

MAIRE is convinced that training and skills development are strategic levers to address this transformation. The demand for professionals in decarbonization, circular economy, energy efficiency, and process digitalization continues to grow. However, the speed of technological innovation and the complexity of new production models require continuous updating of both technical and soft skills, including critical thinking, problem-solving, and the ability to work in multicultural contexts. The results of the studies commissioned by the Fondazione MAIRE – ETS highlight the potential of migrant and refugee workers. In Italy and Europe, the presence of people with a migrant background is now structural and constitutes a fundamental resource for filling skills gaps in key sectors of the green transition. However, significant

obstacles remain: language barriers, difficulties in recognizing qualifications, mismatches between training and labor demand, and gender and cultural stereotypes.

To overcome these critical issues, a systemic approach involving institutions, businesses, training organizations, and civil society is needed. Active inclusion policies, professional training courses, tools for validating skills acquired even in informal contexts, and greater attention to the human and social dimensions of work are required. This is the only way we can transform diversity into value, promoting sustainable and cohesive growth.

This volume brings together replicable experiences and models: from language and technical training initiatives in the Netherlands to Train-to-Hire programs in the United Kingdom and Italian agrivoltaic and green industrial district projects. In all these cases, **a common element emerges: the integration of skilled migrants into the workforce is possible and beneficial** if accompanied by targeted training, coaching, mentoring, and the active involvement of businesses, which should see this as an opportunity for industrial growth.

As the MAIRE Group, we are committed to being an active part of this process. We promote innovative models of training and job placement, encourage collaboration between the public and private sectors, and support the dissemination of best practices at the national and international level. Our experience in technical training and the enhancement of all professional skills allows us to contribute concretely to building an ecosystem of skills for the energy transition.

MAIRE has established strategic partnerships with Italian and

international technical institutes and universities to co-design training courses in line with sector needs. These programs integrate theoretical and practical modules, field experience, coaching, and mentoring, and are designed to facilitate job placement in innovative and sustainable industrial settings.

Another area of intervention concerns the development of local content policies in the territories where we operate. The idea of training people from other countries, with the aim of facilitating, when possible, their return to their places of origin, is part of a strategic vision of local development. Through international experiences, **these professionals can become agents of change in their own contexts**, contributing to the economic and social growth of the territories and strengthening the link between business and community.

MAIRE has also established the "***MAIRE Global Empowerment Scholarship***", a concrete example of how the Group invests in the development of people with international backgrounds and promotes an inclusive and global culture. This scholarship offers young employees of the Group the opportunity to access a high-level international graduate program – the *International Executive Master in Project Management* at the POLIMI Graduate School of Management – with the aim of strengthening the technical and managerial skills essential for working in complex and multicultural contexts. The relevance of the "*MAIRE Global Empowerment Scholarship*" lies not only in the financial support and training opportunities it provides. Above all, its value is that it aims to encourage a new generation of professionals capable of bringing innovation, international vision, and social responsibility both within MAIRE and in their home countries, becoming ambassadors of know-how and of a shared development culture.

We believe that investing in people of all backgrounds and professions is essential for a more equitable and sustainable future. The energy transition is not only a technological issue but also a cultural and social challenge that requires vision, courage, and shared responsibility. In this journey, the training, development, and inclusion of expertise are our most authentic and strategic contribution.

FONDAZIONE MAIRE

ACKNOWLEDGE-MENTS

Acknowledgements

Dr. Antonio Umberto Mosetti would like to thank Samuel Huckstep and Ana Sofia Walsh for this research and for the time they dedicated to discussing the project and their valuable contributions to the direction and quality of the research.

Talent Beyond Boundaries thanks Dr. Gemechu Abeshu, who collaborated on the drafting of the survey and reviewed the paper. Dr. Abeshu is an active researcher contributing to studies on diaspora, refugees, and migration; he currently holds the position of Research Fellow at McMaster University and Research Affiliate at the Centre for Refugee Studies at York University. Academically, he holds a PhD in social anthropology from the University of Bayreuth, Germany, and a master's degree in governance and development studies from the University of Antwerp, Belgium.

For Talent Beyond Boundaries Marina Brizar (Chief Solutions Officer), Jerome Dolling (Germany Employer Engagement Lead) and Betsy Fisher (Chief Strategy Officer) also reviewed and contributed to the final research paper. Rabia Ceylan (UK Healthcare Manager) attended the All-Energy conference in Scotland in May 2025 on behalf of TBB.

This research project was promoted by the Fondazione MAIRE - ETS through a call for proposals launched in July 2024, which led to the funding of eight studies, proposed by five individual researchers and three associations and carried out between March and August 2025, of which this report is a summary.

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We would like to thank Pietro Dessì and Gisella Rossi for their collaboration.

Graphics and layout: Spencer & Lewis srl

Printed in October 2025 by Tiburtini srl

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