

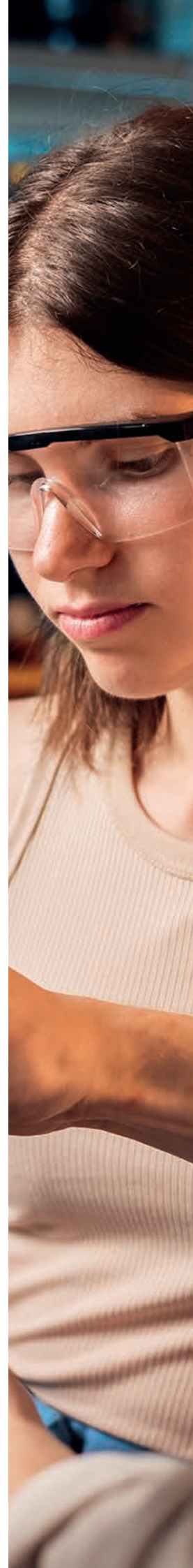
GUIDELINES

for an Inclusive and Attractive VET in STEM and Technical Professions



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1. Premise

1.1 Background and Purpose of the Guidelines

This document constitutes a set of **strategic guidelines** aimed at promoting greater **inclusiveness and attractiveness of Vocational Education and Training (VET)** within the crucial **sustainable energy** sector. The focus is on increasing the participation of **women and underrepresented groups**, who have historically been less present in these areas.

The **primary objective** of these Guidelines is to address and overcome the persistent barriers that limit the access and career progression of women and other minority groups in science, technology, engineering and mathematics (**STEM**) disciplines and, more generally, in technical-professional paths. In this way, it is intended to contribute to the establishment of **real equal opportunities** for all potential talents.

The **strategic approach** is based on solid **empirical evidence**, derived from the concrete data and in-depth analyses collected within the SECOVE project. These guidelines also integrate relevant study findings, established experiences and emerging good practices at European level, providing a strong basis for action.

In the **long term**, our vision is to support and facilitate the implementation of **structural and sustainable reforms**. Such reforms are essential to ensure that the development of the renewable energy sector is not only technologically advanced, but also **balanced and inclusive**, fully reflecting the diversity of society.

1.2 The SECOVE Project and the role of CoVEs

The **SECOVE (Sustainable Energy Community of Vocational Excellence)** project aims to catalyze the promotion of excellence in vocational training, building a solid network of **Centres of Vocational Excellence (CoVEs)**. This network extends strategically among the partner countries involved, which include Italy, Portugal, Spain, Greece and Slovakia.

The **operational structure** of this platform is designed to maximise impact: each participating country hosts its own CoVE, which allows not only for the implementation of **specific and targeted interventions at local level**, but also for **synergistic and effective coordination at European level**. This model ensures that strategies are relevant to the national context while benefiting from a broad transnational vision.

The **main areas of action** on which the SECOVE project focuses its efforts are many and interconnected. They include, first and foremost, **educational innovation**, with the aim of promoting and implementing cutting-edge teaching methodologies that foster fully inclusive STEM education. Secondly, the aim is to **develop and strengthen technical and scientific skills**, which are essential for preparing professionals capable of operating in an increasingly demanding and, above all, fair labour market. Finally, a key priority is strategic **collaboration with companies and institutions**: this synergy is crucial to create meaningful connections and actively support women's employment in technical professions, breaking down gender barriers.

1.3 Challenges and opportunities in Vocational Training

The analyses conducted within the SECOVE project have unequivocally highlighted the persistence of **significant critical issues** that continue to hinder and limit the full inclusion of women and underrepresented groups in STEM disciplines. The most significant issues include:

- The deep-rooted **gender stereotypes**, which profoundly influence educational and professional choices from the early years of childhood, directing aspirations and sometimes precluding paths considered 'non-traditional'.
- A marked **low representation of women** in STEM sectors, a phenomenon attributable not only to widespread cultural prejudices, but also to concrete institutional barriers that have historically marginalized female participation.
- The evident **lack of female role models** and adequate support networks dedicated to female students who undertake or wish to pursue careers in technical professions, a factor that can negatively affect motivation and persistence.

Nevertheless, it is equally clear that the current landscape presents **important opportunities** that can act as a catalyst for a decisive change of course. These include:

- The possibility of implementing advanced **educational reforms** and adopting **inherently more inclusive teaching methodologies**, capable of enhancing diversity and stimulating the interest of a wider audience.
- The introduction of **targeted economic incentives and scholarships dedicated** specifically to women who choose STEM paths, in order to mitigate socio-economic barriers and encourage participation.
- The potential of closer **and more synergistic collaboration between companies and educational institutions**, essential to co-create innovative and structurally more accessible learning pathways, in line with labour market needs and individual aspirations.

1.4 Operational objectives of the Guidelines

To effectively respond to the identified challenges and promote lasting change, these Guidelines developed within the SECOVE project aim to offer practical and methodological tools for educational institutions, trainers and companies on how to make VET pathways more inclusive and attractive.

The focus is on identifying operational solutions, teaching methodologies, good practices and concrete tools to promote the inclusion and success of women and underrepresented groups in STEM.

The Guidelines are aimed at vocational schools, teachers, trainers, companies involved in VET, students, mentors and trade associations.

The impact we would like to cause would be the direct improvement of the learning experience, the implementation of more inclusive teaching strategies and the creation of fair and stimulating learning environments.

Among the **operational and more specific objectives** we aim to achieve are:

- **Strengthening and refining data collection and policy monitoring:** a key action to enable targeted, evidence-based interventions that accurately identify areas of greatest need and measure the effectiveness of actions taken.
- **Addressing intersectionality and multiple discriminations:** recognizing the complexity of the barriers that can overlap (related to gender, ethnicity, disability, socio-economic status, etc.), we are committed to ensuring educational paths that are equally accessible and inclusive for every individual, overcoming all forms of discrimination.
- **Actively involve a wide range of stakeholders and institutions:** synergistic collaboration with public and private actors is crucial to build robust and effective support networks, capable of accompanying female students and underrepresented groups along their educational and professional path.
- **Enhancing training and expanding learning opportunities:** with a specific emphasis on the development of innovative experiential programs, such as the **STEM Summer Academies**. These initiatives aim to stimulate interest, strengthen practical skills and provide positive role models, helping to demystify technical disciplines. Other useful tools are: dedicated workshops, the creation and continuous updating of Observatories, communication campaigns etc.
- **Define clear and measurable impact indicators:** essential for rigorously assessing the success of the reforms implemented. Such constant monitoring will allow strategies to be adapted to emerging needs in a timely manner, ensuring continued relevance and effectiveness of policies.



2. Data collection and monitoring for effective education policies

2.1 The strategic role of Data in inclusive learning

Inclusion in STEM disciplines and in Vocational Training and Education cannot be guaranteed without a conscious and strategic use of data. The systematic collection of disaggregated data and information, both quantitative and qualitative, is **the indispensable analytical basis** to guide policy choices and ensure that reforms have a concrete and measurable impact.

Through structured monitoring, it is possible to:

- **Accurately identify the barriers** that hinder access to and permanence in STEM education pathways, allowing you to understand the causes of existing disparities.
- **Evaluate the effectiveness of the strategies adopted**, ensuring that each intervention is based on evidence and not on assumptions.
- **Modulate and adapt policies** in response to the data collected, promptly correcting less effective initiatives and strengthening those that show positive results.

An effective data collection system must operate **in a coordinated manner between educational institutions, companies and research bodies**, ensuring total transparency and encouraging comparison between different national and European realities.



2.2 Data Collection Strategies and Monitoring Systems

To ensure a complete analysis, a **balanced approach** is recommended, integrating quantitative and qualitative tools that can provide a clear picture of inclusion dynamics. As far as **quantitative data** are concerned, which offer a statistical and metric view of inclusion, the use of gender-disaggregated data (gender-disaggregated data) is a priority: fundamental for conducting an in-depth analysis of women's access to VET courses in STEM disciplines, accurately identifying numerical disparities.

The **quantitative indicators** allow a numerical assessment of the impact of policies:

- **Enrolment and completion rates in STEM pathways**, to measure female student retention and assess the attractiveness of courses.
- **Post-VET job placement rates**, disaggregated by gender and by group, to analyse the effectiveness of access to the labour market.
- **Funding and scholarships for vulnerable and underrepresented groups**, measuring the impact of economic incentives on reducing access inequalities.

Alongside numerical data, **qualitative indicators** play a crucial role, offering an in-depth view of students' experiences:

- **Focus groups and interviews**, fundamental tools for collecting direct perceptions and identifying less visible obstacles.
- **Analysis of the educational environment**, considering accessibility of infrastructures, inclusive languages and teaching support.
- **Monitoring of trust in STEM skills**, through structured questionnaires that investigate the sense of belonging and motivation of female students.

In addition to the educational dimension, monitoring includes a **direct connection with companies**, collecting data on post-training career paths to ensure better alignment between education and work.



2.3 Monitoring, feedback and adaptation of Inclusion policies

One of the most crucial aspects of data collection is the ability to translate it into **concrete actions**. An effective monitoring system must ensure a continuous review of inclusion policies, avoiding static approaches and ensuring that each strategy is dynamic and adaptable in response to the emerging needs of students and the labour market.

Policy review and adaptation cycle

Monitoring should be structured as a **continuous process**, allowing the impact of the reforms introduced to be assessed and amended in a timely manner to meet the needs of under-represented groups. The review cycle includes:

- **Regular consultations with trainees and trainers**, to collect feedback on the strategies implemented and identify emerging critical issues.
- **Biennial review of policies**, with evidence-based updates, correcting less effective initiatives and amplifying successful ones.
- **Integration of data into curricula**, adapting training programs to meet the needs identified through monitoring.

This approach ensures that inclusion is not a static goal, but an **evolutionary** process, capable of modelling itself on changing educational and employment realities.

Inclusivity indicators for effective monitoring

To assess the effectiveness of inclusion policies, it is crucial to establish **measurable impact indicators**, covering different aspects of access to and participation in STEM pathways:

- **Enrolment rates and educational success**, analysed with an intersectional approach to identify disparities between vulnerable groups.
- **Post-VET job placement rates**, to measure the effectiveness of strategies in facilitating the transition to the labour market.
- **Structured feedback mechanisms**, which collect qualitative evaluations directly from students and teaching staff, ensuring a cycle of continuous improvement.
- **Annual reports**, to track the progress of the strategies adopted, identify new trends and promote transparency and accountability.

Optimizing educational pathways through data

A further fundamental step is **to reuse the data collected** to refine and optimize educational programs. This implies:

- **Updating of training methodologies**, based on the evidence that emerged from monitoring.
- **Improvement of support materials**, integrating more inclusive and representative content.
- **Strengthening mentoring paths**, adapting them to the specific needs of underrepresented groups.

Through these tools, monitoring becomes not only a means of evaluation, but an **engine for the evolution of inclusion strategies**, ensuring a tangible and lasting impact.

2.4 Guidelines for effective monitoring

To ensure that monitoring is a **driver of continuous improvement**, it is crucial to take steps that ensure transparency and auditability of the data collected. The SECOVE project recommends:

- **Advanced digital tools**, to collect and analyze data in real time.
- **Detailed periodic reports** to track progress, identify issues and make recommendations.
- **Active stakeholder involvement**, including educational institutions, companies and civil society in the process of evaluating and adapting strategies.

Effective monitoring makes it possible to **optimise the impact of inclusion policies**, making them more relevant, adaptable and sustainable in the long term.



3. Addressing intersectionality and Multiple discrimination

3.1 The importance of an intersectional approach

Equal access to Vocational Training and Education in STEM disciplines is intrinsically influenced by a **complexity of interconnected factors**, which transcend the gender dimension alone. Elements such as “ethnicity”, socioeconomic background, disability and gender orientation intersect, creating unique experiences and often exacerbating disparities. The SECOVE project strongly emphasizes that **intersectionality** should not be understood as a mere theoretical construct; on the contrary, it represents a **fundamental analytical and operational tool**.

An intersectional approach allows for **the development of more targeted training policies**, shaping courses and supports according to the specific needs of students expressing different kind of needs. In parallel, it is essential to provide flexible learning tools for trainees with migrant background, accessible infrastructure for persons with disabilities, so that no physical or technological barriers stand in the way of participation, and non-discriminatory spaces for non-binary people.

3.2 Key Barriers for underrepresented groups

The analyses carried out within the SECOVE project have made it possible to clearly identify several **persistent forms of discrimination** that, in a systematic way, limit equal access to and full participation in VET pathways and STEM disciplines, especially for historically underrepresented groups. These barriers manifest themselves in complex ways:

Firstly, **Multiple discrimination** emerges when individuals belonging to different minority categories suffer cumulative disadvantages. For example, women with a migrant background often face a combination of barriers including prejudices gender based and related also to racism and xenophobia, as well as significant difficulties in recognising professional and academic qualifications obtained abroad.

Similarly, LGBTQI+ students may encounter school environments characterized by trans-omophobia behaviours, sometimes aggravated by the lack of adequate structures and supports for non-binary people specific needs.

People with disabilities, in turn, are confronted with both infrastructural barriers, such as inaccessible physical spaces, and educational barriers, highlighting a lack of assistive technologies and adapted teaching methodologies.

Secondly, a marked **segregation in educational pathways is observed**. This is divided into two main dimensions: **horizontal segregation**, whereby women tend to be overrepresented in sec-

tors traditionally associated with care and assistance, while men dominate fields such as engineering and computer science. In parallel, **vertical segregation manifests** itself in women's limited access to decision-making roles and leadership positions within STEM sectors, creating a "glass ceiling" that hinders career progression.

Finally, a significant role is played by **Implicit biases and stereotypes**, which often operate at a subconscious level but with concrete impacts. These include **cultural biases**, i.e. widespread beliefs that women are inherently less inclined to technical-scientific disciplines. Added to this is a chronic **lack of female role models**, both in teaching materials and teaching strategies, which makes it difficult for young female students to imagine themselves in such roles. This context contributes to generating a deep **sense of exclusion**, direct or indirect experiences of discrimination that can significantly undermine the self-confidence and motivation of female students, sometimes leading them to abandon the paths they have taken.

To overcome these barriers, it is crucial **to anticipate concrete solutions**, which will be explored in the following sections, including targeted scholarships, mentoring paths and updating teaching materials to include diversified reference models.

3.3 Strategies for a more inclusive VET

To ensure real inclusion, a **multi-layered approach** is needed, integrating supportive policies, active participation and structural reforms.

Firstly, the adoption of **targeted support measures for vulnerable groups** is crucial. This includes the establishment of **dedicated scholarships** that can specifically benefit women with a migrant background or in conditions of economic difficulty, breaking down financial barriers to access to training. In parallel, the development of **structured mentoring programmes** that connect students and individuals from disadvantaged groups with established STEM professionals can provide crucial support, inspiration and guidance. It is also imperative to ensure **adapted training pathways**, equipped with state-of-the-art assistive technological tools and hosted in fully accessible infrastructures, ensuring that no physical or technological obstacle precludes participation.

Secondly, **Participatory Policies and Co-design are promoted**, recognizing that the most effective solutions emerge from the direct involvement of the communities concerned. The organisation of **forums and consultation groups** that actively include underrepresented people is encouraged. This co-design approach is vital for devising reforms that are not only more effective, but also genuinely responsive to real needs. In addition, the organization of **awareness-raising workshops** aimed at teachers and institutional staff is crucial to deepen the understanding of intersectionality and prevent the reproduction of bias. The innovative use of **digital tools** for the continuous collection of feedback from vulnerable groups will ensure that policies remain relevant and responsive.

Finally, **structural reforms are needed** to break down systemic obstacles. For this reason, it is necessary to **update the teaching materials**, including female models and leaders from non-Western contexts. In addition, the creation of **accessible infrastructure** and modular STEM curricula fosters equitable and flexible learning.

4. Stakeholder engagement and Public awareness

4.1 Outreach Strategies for greater inclusivity

To make VET and STEM disciplines fully accessible to women and all underrepresented groups, it is essential to trigger a profound **cultural change**. This transformation must be supported by **strategic and targeted communication campaigns**, capable of changing deep-rooted perceptions and stereotypes.

The SECOVE project has piloted several awareness campaigns, some of which have shown concrete results:

First of all, the **use of inclusive storytelling** is essential. It is essential to promote and disseminate authentic narratives of women and individuals from minority groups who have achieved success in STEM fields. This specifically involves highlighting the positive experiences, offering diverse and accessible role models that can inspire and motivate.

At the same time, it is crucial to ensure full **accessibility of content and inclusive visual and textual communication**. This means using images and languages that are representative and bias-free in all information and advertising materials. At the same time it is necessary to avoid inadvertently feeding the dominant imagery that sees mainly represented Western, able, young, white people, responding to a certain social and aesthetic canon, by which however many people do not feel represented. Just as any aspect that lets emerge relationships and dynamics of hegemony and power must be the object of attention in the construction of images and communication campaigns. It is very common in fact to see men in roles of power or decision-making, who teach and explain to women, and this is a dynamic that must be deconstructed at the level of the imagination. In this regard, vital strategy is the **active involvement of established female role models in STEM**. Through collaboration with figures such as the 'STEM Ambassadors', the aim is to inspire the new generations, showing concrete and successful career paths. It will also be crucial to regularly create **interactive dialogue spaces**, such as events and workshops, that facilitate the meeting and exchange between students and STEM professionals, allowing technical professions to be demystified.

Finally, the design of **awareness campaigns with strategic targets** is essential. These campaigns need to be specifically tailored to reach different audiences: from young female students who are defining their educational choices, to women transitioning careers, to the most vulnerable groups.

In addition, in terms of full accessibility, it is imperative to implement solutions such as video subtitling and the adoption of advanced digital accessibility tools, in order to ensure a wide and barrier-free use for each potential recipient.

4.2 The Strategic Role of stakeholders in Promoting inclusion

The promotion of a real inclusion of women and underrepresented groups in STEM sectors and, more broadly, in the field of Vocational Training and Education VET, is an objective that **transcends the competence of a single actor**. It requires, in fact, a **synergistic and joint commitment** that actively involves a wide range of subjects: from educational institutions and businesses, to local communities and policy makers. Proactive **stakeholder engagement** is not a mere formality, but a prerequisite for ensuring that the policies and strategies developed are not only ambitious, but also realistic, pragmatic and, above all, sustainable in the long term. Only through this collaboration can initiatives be anchored to the real needs of the context.

With this in mind, the SECOVE project has precisely identified the following **categories of key stakeholders**, each with a distinct and complementary role in the inclusion ecosystem:

- **Government institutions** must ensure structured funding for inclusion programs and provide a clear regulatory framework to incentivize equality in STEM pathways.
- **VET Centres and schools** must translate these directives into concrete training actions, introducing **educational modules based on the inclusion data collected**.
- **Companies** play a crucial role in linking training with employment. The implementation of **co-designed corporate mentoring programs**, internships, and training paths improves access to employment for underrepresented groups.
- **Civil society organizations** provide direct support to female students and promote awareness campaigns aimed at communities.
- **Families and local communities** influence educational choices and must be actively involved to overcome gender stereotypes, creating a favourable environment for orientation towards STEM disciplines.

4.3 Creating collaboration and Partnership networks

To significantly increase the effectiveness of inclusion policies and ensure a systemic impact, it is **essential to establish and consolidate structured and synergistic connections** between multiple stakeholders. This collaborative approach is key to generating an ecosystem conducive to diversity and equality:

Partnerships must translate directly into **new learning opportunities**, such as:

- **Training courses co-designed between schools and companies**, developed on the basis of the skills required by the labour market and adapted to foster the inclusion of women in technical professions.
- **Inclusive internship and internship programs**, designed to offer concrete professional experiences to STEM students.
- **Company policies to encourage female employment**, which reward companies committed to promoting gender equality.
- **Creation of European networks**, through the exchange of best practices between the coun-

tries participating in the SECOVE project, to amplify the impact of the strategies already tested.

4.4 Monitoring and Adaptation of Outreach Strategies

To ensure that awareness campaigns and inclusion policies achieve maximum effectiveness and generate a measurable impact, a monitoring system oriented towards corrective actions is essential, which allows the effectiveness of strategies to be measured and modified on the basis of the data collected. This dynamic approach allows you to optimise investments and refine strategies over time. To this end, it is suggested to:

- **Implement advanced tracking tools** to monitor the impact and resonance of awareness campaigns. This includes measuring their reach, audience engagement, and changes in perceptions or behaviours, providing actionable data on communicative effectiveness.
- **Use direct feedback** mechanisms, with interviews and focus groups to gather experiences and continuously improve awareness programs.
- **Proactive adaptation of strategies**, through the analysis of the results obtained and the re-shaping of campaigns based on what works best.

In addition, **the data collected must be integrated into educational programs**, ensuring that training modules are dynamically updated and respond to the real needs of students and the market.



5. Improving Training and Learning Opportunities

5.1 Need for More Inclusive and Accessible Learning Paths

A truly inclusive VET system not only expands access to STEM disciplines, but also ensures the quality and continuity of training, preparing professionals with strategic skills for emerging sectors such as sustainable energy. To achieve this, it is essential to **review training programs**, breaking down the barriers that limit the entry and progression of women and underrepresented groups.

SECOVE has shown how access difficulties derive from a mix of structural and cultural factors, which can be overcome through **innovative teaching methodologies and personalized learning paths**. A training model that integrates **modularity, practical experiences and flexibility** makes it possible to respond dynamically to the needs of students, ensuring greater retention and a positive impact on their readiness for the job market.

5.2 STEM Summer Academies: A strategic approach

The STEM Summer Academies are widely recognized as **extremely effective pedagogical tools** and have proven to be **highly effective tools** for increasing female students' confidence in scientific disciplines and countering gender stereotypes. The SECOVE project has piloted these programs in several European countries, finding a significant increase in the interest and motivation of participants towards technical and engineering paths.

The success of these STEM Summer Academies is attributable to a combination of **carefully designed** key elements:

- **Practical and immersive experiences:** Through the organization of laboratories and engaging experimental activities, students have the opportunity to concretely apply scientific and technological principles, strengthening their understanding and interest in the subjects.
- **Meetings with successful female role models:** The possibility of interacting directly with scientists, engineers and other established professionals in the STEM sector offers tangible inspiration and demolishes the perception that these areas are closed to women, showing real and achievable career paths.
- **Peer support and community building:** Creating support networks between female students who share common interests in STEM is critical. This fosters a sense of belonging, encourages collaboration, and provides a safe space to discuss challenges and successes, strengthening motivation.
- **Site visits and direct company experiences:** The exploration of concrete work contexts

through guided tours in companies and industries in the sector allows participants to visualize future professional opportunities and understand the real impact of STEM disciplines.

- **Multidisciplinary approach and innovative themes:** The integration of different STEM disciplines, with a specific focus on current and relevant issues such as sustainability and technological innovation, makes the programs stimulating and relevant to the challenges of the contemporary world.

The data collected by the STEM Summer Academies showed **growth in participants' interest in post-academy STEM pathways**, with a positive impact on enrolment in university and VET courses.



5.3 Teacher Training and Inclusive Teaching Methods

To ensure that educational reforms have a **lasting and transformative impact**, it is absolutely **essential to allocate significant investments to the continuous training and updating of the teaching staff**. The primary objective is to equip teachers with the skills and awareness necessary to adopt intrinsically more inclusive teaching methodologies and to fully enhance the diversity present in the classroom, transforming it into a resource. **Key strategies** for improving teacher training include:

- The organization of **specialized refresher courses** focused on advanced teaching techniques for gender and cultural inclusion. These training courses aim to provide teachers with the practical tools to create equitable and stimulating learning environments for all students.
- The development and dissemination of **innovative educational toolkits** that actively integrate successful female models and international leaders into STEM teaching materials. This approach is crucial for broadening students' perspectives and countering ingrained biases, offering diverse representations of talent and success.

- Encouraging the **adoption of** active methodologies, such as problem-based learning and co-operative learning, to stimulate critical thinking and problem-solving.

The training of teaching staff has a direct impact on the **quality of learning**, improving students' inclusion and confidence in their educational journey.

5.4 Modularity and Flexibility in Training Courses

To ensure **equitable and universal access** to VET, it is crucial to design and offer **highly adaptable and flexible learning pathways**. These must be structured in such a way as to respond effectively to the diverse and complex needs of female students, particularly those facing economic difficulties, family responsibilities or other barriers. **Key strategies** to increase the inclusiveness and accessibility of these pathways include:

- The implementation of **modular programs**, which allow **personalized and progressive learning**. This approach allows students to build their own training path in blocks, adapting it to their own rhythms and availability, facilitating the reconciliation with personal or work commitments.
- The offer of **flexible courses**, designed specifically to meet the needs of students with special needs, such as workers who want to retrain or people with care commitments. Flexibility can be about schedules, modes of attendance, and duration, making training accessible to a wider audience.
- The guarantee of **universal access to assistive technologies and dedicated supports**. This is crucial to ensure equal learning opportunities for all students with disabilities, eliminating technological barriers and providing the necessary tools for effective interaction with educational content.
- The development and expansion of **online courses and blended learning methods**. These options are crucial to overcoming geographical and economic barriers, democratising access to skilled training and enabling more individuals to benefit from quality education, regardless of their location or socio-economic status.

The implementation of **these tools has improved retention in STEM courses**, facilitating the completion of training courses.

5.5 Collaboration between Institutions and the Private sector

Strengthening the connections between **educational institutions, companies and research centers** is crucial to ensure that training responds to the real needs of the labor market. SECOVE has developed **models of public-private collaboration**, which have demonstrated a positive impact on the employability of female students in STEM sectors.

Strategic initiatives include:

- **Internships and company internships for young women in STEM**, which promote concrete experiences and easier access to the labor market.
- **Joint training programmes**, where universities, VET centres and companies work together

to continuously update curricula and ensure that the skills acquired are in line with the demands of the technology sector, equality issues and gender balance.

- **Incentives for companies to** promote gender equality and inclusion policies in their recruitment programs.

These partnerships not only facilitate the transition from **education to work**, but create a **virtuous cycle of corporate inclusion**, with positive effects on diversity in professional teams.

5.6 The Role of Observatories for Strategy evaluation

One further key tool is the **establishment of permanent Observatories**, in charge of monitoring the **effectiveness of inclusion strategies** in STEM and VET pathways. These observatories:

- **collect data on gender gap**, analysing trends and difficulties faced by underrepresented groups.
- **evaluate the impact of modularity and flexibility strategies**, measuring the effectiveness of adaptable programs, if any.
- **integrate evidence into decision-making processes**, providing recommendations to optimize inclusion policies.

Through the Observatories is possible to **monitor the improvement of access to STEM**, identify best practices and refine strategies to ensure a lasting impact.



6. Building an inclusive Future: Commitment and Action

6.1 Importance of a structural and ongoing commitment

To achieve **real and lasting inclusion** in the Vocational Training and Education sector and in STEM disciplines, it is essential to adopt a **systemic and long-term approach**. It is essential to abandon the logic of isolated or temporary interventions, which have proven insufficient to generate significant change. The in-depth analyses carried out within the SECOVE project, together with the best practices consolidated at European level, converge in highlighting that effective inclusion requires the implementation of **profound and structural changes** that act simultaneously at institutional, educational and cultural levels.

A **lasting and fruitful commitment** in this direction must be based on indispensable pillars:

Investments must be **targeted and verifiable**, so that they translate directly into concrete opportunities for women and underrepresented groups. For example, funding **scholarships and structured mentoring programs** has been shown to significantly improve female student retention in STEM pathways. In addition, allocating resources for **accessible infrastructure** is essential to ensure equal learning opportunities.

A dynamic monitoring system allows strategies to be **continuously adapted**, ensuring that policies remain effective and respond to changes in the social and economic environment. Finally, the active involvement of all stakeholders is crucial to **create an inclusive educational and professional ecosystem**, where diversity is recognized as a strategic value for innovation and growth.

6.2 Recognizing and addressing the complexities of intersectionality

To achieve authentic and comprehensive inclusion in STEM disciplines, it is **imperative to recognize that gender is not the only factor at play**. Access and participation are profoundly influenced by a **complex network of intersecting elements**, such as special needs, migration background, socio-economic status, and so on. Inclusion policies must, therefore, be inherently **flexible and highly adaptable**, in order to propose targeted and differentiated solutions for the different categories of individuals who face multiple and overlapping discrimination.

Inclusion is not just about the gender dimension, but about a number of intersecting factors that influence access to and participation in STEM.

6.3 Early education and Social outreach

Scientific evidence unequivocally demonstrates that **gender disparities in STEM disciplines have deep roots, often originating from childhood**, influencing young people's aspirations and educational choices at an early age. Faced with this reality, must be emphasized the crucial importance of **intervening from primary schools**, actively promoting educational programs that not only **normalize the presence of women in STEM**, but are also capable of **deconstructing gender stereotypes** rooted over time.

To achieve this transformative goal, **key strategies** include:

- The adoption of **intrinsically neutral and inclusive educational models**: these approaches must be designed to stimulate and foster the interest of all students in science and technology subjects, eliminating any form of cultural barrier or implicit prejudice that may preclude participation.
- The **systematic and diverse introduction of female and non-Western models in school curricula**: integrating successful figures from different backgrounds and cultures is essential to broaden the perspectives of young people, show the plurality of talents and inspire the new generations, offering concrete examples of female success in STEM.
- The organization of **interactive workshops and experiential activities** within schools: these practical initiatives are essential to stimulate children's innate curiosity, promote direct involvement in STEM disciplines from a young age and make learning more dynamic and accessible, dispelling the myth of the complexity of these subjects.



6.4 Creation of a European network for the sharing of Best practices

To ensure a lasting impact, inclusion policies must be **scalable and replicable** in different European countries. The SECOVE network has shown that transnational collaboration allows to optimize resources and improve educational strategies.

Stakeholders can actively contribute through:

- **Sharing of data and strategies** between CoVEs.
- **Discussion forums and discussion tables**, involving educational institutions, companies and civil society.
- **Dissemination of best practices** through scientific publications, conferences and digital platforms.

Expanding and strengthening this network means **accelerating the adoption of successful inclusive models**, making STEM education accessible on a global scale.

6.5 Call to Action: Strategies for the future

Inclusion in STEM and VET must become a **structural priority** for institutions, companies and civil society. The proposed Call to Action aims to ensure tangible and lasting change through:

- **Sustainable and binding funding** for inclusion programs and scholarships.
- **Rigorous monitoring of the impact of strategies**, to optimize policies based on evidence.
- **Strengthening collaboration between European institutions and local stakeholders**, creating a synergistic network for the dissemination of best practices.



Conclusion: The urgency of action

Inclusion in STEM is not just a matter of equity, but a strategic necessity for social and economic development. The data collected in the SECOVE project show that the reforms adopted are having a positive impact, but it is crucial **to continue to invest, monitor and adapt strategies** so that this change becomes permanent.

The international community has a responsibility to **accelerate the process**, ensuring that access to STEM is equitable, inclusive and barrier-free. Only through a collective and coordinated commitment will it be possible to transform STEM education into an engine of growth and innovation for all.



ANNEXES



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WP5. MAKING SECOVE INCLUSIVE AND ENCOURAGING WOMEN IN TECHNICAL PROFESSIONS

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SECOVE

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T5.6 Policy Recommendations for Inclusive and Attractive VET in Sustainable Energy

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Policy Recommendations for inclusive and attractive VET in Sustainable energy (T5.6)

Introduction

These policy recommendations aimed at fostering inclusivity and attractiveness of Vocational Education and Training (VET) in sustainable energy sectors. Developed within the SECOVE project framework, these recommendations align closely with the project's objectives to address barriers in STEM and VET education, promote stakeholder engagement, enhance public awareness, and improve training programs for diverse learner groups. The recommendations provide practical guidance for policymakers, institutions, and educational organizations committed to inclusive and sustainable development in vocational education.

SECOVE aims to establish a cooperation platform for Centres of Vocational Excellence (CoVEs) across Europe in the sector of renewable and sustainable energy. It is locally based, with a CoVE in each partner country. The platforms' main goal is to promote the uptake of innovative and qualitative lifelong learning opportunities, oriented towards the development of skills, competencies and the achievement of qualifications, including the promotion of equal opportunities for all.

1. Strengthening data collection and policy monitoring

Enhancing research on inclusivity in VET (see T5.1 - National Research)

The SECOVE report (T5.1) highlights the strategic necessity of integrating both quantitative and qualitative data in policy and program development to achieve inclusiveness in VET systems. Quantitative data (e.g., enrollment statistics, gender distribution, dropout rates, survey results) provide clear metrics on inequalities, enabling policymakers to track disparities over time and across regions. Qualitative data (e.g., focus groups, interviews, personal narratives) reveal context-specific obstacles and the emotional and psychological impact of exclusion that cannot be captured through numbers alone. For example, focus groups brought to light experiences of microaggressions, unconscious bias by teachers, and lack of inclusive infrastructure.

The report also calls for systematic monitoring frameworks at national and institutional levels, including:

- Use of gender disaggregated data in reporting and analysis.
- Implementation of inclusivity indicators in evaluating VET performance.
- Regular review of policies to assess their impact on vulnerable groups, such as women, migrants, people with disabilities, and LGBTQI+ learners.



Without reliable and nuanced data, the risk is to oversimplify the challenges and design generic solutions that fail to address structural inequalities.

Relevance of qualitative and quantitative data collection includes:

- **To avoid gender stereotypes** reinforced from an early age, with educators and parents unconsciously directing boys toward technical careers and girls toward caregiving roles. This has led to a significant underrepresentation of women in ICT.
- **To promote an inclusive culture from schools**, introducing educational programs that promote gender equality, inclusion, and diversity from elementary schools. This can help combat early prejudices and stereotypes, and encourage all to explore scientific and technical disciplines, including the field of sustainable energy.
- **To support positive role models**, promoting and highlight female role models in the field of sustainable energy. This can be done through awareness campaigns, success stories of women who have excelled in training and employment in the sector, as well as the establishment of mentorship networks for women aspiring to careers in sustainable energy. The same can be implemented through positive figures not belonging to the western world, or part of minorities, with special needs, migration background, etc.
- To facilitate access to vocational training, **reducing economic barriers** to accessing vocational training in the field of sustainable energy by providing scholarships, grants, or subsidized loans for women, people belonging minorities and/or with migrant background, interested in pursuing training courses or study programs in the field.
- **To create mentorship programs**, developing specific ones for women (but also people with special needs, belonging to minorities), etc. in the field of sustainable energy, where experienced professionals provide support, advice, and guidance to young women aspiring to enter the sector. These programs can help break the cycle of isolation and increase self-confidence in pursuing a career in this field.
- **To promote pay equity and work-life balance policies**, implementing policies that promote pay equity between men and women in the sustainable energy sector. Additionally, provide incentives and measures that facilitate work-life balance, such as flexible working hours, company day-care centres, and balanced parental leave policies.
- **Collaboration among institutions, businesses, and organizations**, fostering collaboration between educational institutions, businesses, and organizations in the sustainable energy sector to develop specific training programs that address the sector's needs and promote inclusion and gender equality.
- **Conduct detailed and systematic collection of gender-disaggregated data** to accurately monitor women's participation in STEM, noting the persistently low female representation.



- **Implement robust monitoring frameworks** that track enrollment, retention, and career outcomes for women and marginalized groups in VET programs, allowing for informed, data-driven policy adjustments.
- **Collecting data on women's access and participation** in vocational training in the field of sustainable energy and monitor progress in reducing the gender gap. This will help assess the effectiveness of policies and interventions implemented and identify any areas that require further corrective actions.

2. Addressing intersectionality and multiple forms of discrimination in STEM and VET

SECOVE WP5 set of activities reveals a complex picture of intersectionality between social, cultural and institutional factors and individual motivations and values, that affects the participation of young women in STEM.

The SECOVE research applies the intersectionality framework to reveal how multiple and overlapping dimensions of identity (e.g., gender, ethnicity, socioeconomic background, disability, sexual orientation) shape learners' access to and experience of VET. Therefore, this key aspect should be monitored to identify the multiple dimensions of inclusion and to contrast and prevent discriminatory dynamics.

- **Women with migrant background face compounded barriers not only due to gender but also due to racism, xenophobia,** and lack of credential recognition.
- **LGBTQI+ learners may feel alienated in heteronormative environments** lacking inclusive language, facilities, or policies.
- **Students with disabilities often encounter infrastructural and pedagogical barriers,** such as inaccessible classrooms or lack of assistive technologies.

Forms of discrimination identified includes:

- **Horizontal segregation:** Concentration of one gender in specific education fields (e.g., men in engineering, women in care sectors).
- **Vertical segregation:** Limited access for women and minorities to higher-level positions and leadership in VET.
- **Stereotype threat and implicit bias:** Cultural expectations and peer/teacher biases discourage minority students from pursuing STEM.
- **Intersectionality** is not only a lens of analysis, but also a tool for transformation, helping identify where reforms are most urgently needed and for whom.



In light of the consideration briefly mentioned, it is possible to outline different strategies and recommendations

Designing targeted support measures for underrepresented groups:

- implementing tailored interventions that address the specific needs of marginalized populations (e.g., migrant women, LGBTQI+ youth, students with disabilities). Universal policies often overlook structural inequalities; otherwise, targeted support helps level the playing field and removes barriers to participation. Specific measures may include:
- creating scholarships and mentorship programs for migrant and low-income women;
- offering tutoring and peer support services specifically designed for LGBTQI+ students;
- ensuring accessible pathways for students with disabilities, including assistive technologies and learning accommodations.

Encourage Participatory and Inclusive Policy Design:

- involve marginalized groups in the co-creation of STEM inclusion policies and initiatives. Inclusive decision-making leads to more effective, relevant, and equitable outcomes. It also empowers communities to take ownership of the change process.

Specific measures may include:

- establish advisory boards or focus groups that include underrepresented voices;
- facilitate youth consultations and participatory workshops when designing STEM education reforms. Use digital tools to gather feedback from target audiences on an ongoing basis.

Overlapping Barriers:

SECOVE survey data reveal that students with migrant backgrounds, LGBTQI+ individuals, and those from disadvantaged socioeconomic backgrounds experience compounded forms of discrimination in VET and STEM education.

Develop tailored supportive measures for migrants, LGBTQI+ individuals, and economically disadvantaged learners, enhancing equitable access to quality STEM education and fostering inclusive, discrimination-free environments.

3. The role of experiences and perspectives of marginalized groups



Interviews, focus groups and workshops reveal critical issues:

- **Learners feeling underestimated or ignored**, a lack of female and non-Western leadership role models in educational materials, gender and cultural biases from instructors, and institutional shortcomings such as gendered language, inadequate inclusive facilities, and poor accessibility.
- **The barriers negatively impact self-confidence of learners**, motivation, career aspirations, and sense of belonging, contributing to disengagement and higher dropout rates.
- **Incorporating marginalized voices into policy and program design** enables the development of learner-centered interventions, targeted teacher training, improved infrastructure, and more inclusive and accessible learning environments.
- **Adopting a holistic and inclusive approach** to VET reform strengthening disaggregated data collection by gender, ethnicity, disability, and other diversity factors, and
- **Integrating an intersectional perspective** in policies and training programs, centering the lived experiences of marginalized learners.
- **Updating educational materials to include female and non-Western leaders** and role models and support mentorship programs targeting women, gender minorities, and LGBTQI+ students in STEM pathways.
- **Improving accessibility and inclusive infrastructure** to ensure universal design principles applied in classrooms and facilities, including accessible restrooms and assistive technologies and allocate resources for ongoing improvements in physical and digital accessibility.
- **Fostering continuous dialogue between learners and institutions** establishing feedback mechanisms such as advisory groups including marginalized learners and use this input to inform policy adjustments and improve training quality.
- **To actively involve marginalized communities in the development and evaluation of training programs**, leveraging qualitative insights from SECOVE's workshops and participatory activities.
- To establish continuous engagement mechanisms, such as regular forums and interactive workshops, **ensuring that the voices and experiences of marginalized groups** consistently inform policy development and educational practices.

4. Enhancing stakeholder engagement and public awareness

The following SWOT analysis emerged from a participatory workshop involving key stakeholders in the vocational education and training (VET) ecosystem — including policymakers, training providers, school institutions, students, and VET professionals.



The workshop was designed to explore challenges and opportunities in making STEM education more inclusive for girls and disadvantaged groups. The discussion focused on early STEM engagement, the development of self-efficacy in facing demanding educational pathways, and the importance of experiential learning opportunities such as internships and dedicated summer schools. The insights collected have been synthesized into the following SWOT framework, highlighting the internal and external factors that can influence the successful implementation of inclusive STEM initiatives in VET.

5. Enhancing Awareness campaigns for VET inclusion (T5.4 - Awareness campaigns)

Recommendation	Strategy (why)
1. Use Inclusive Storytelling: Support campaigns that share authentic stories of women and underrepresented individuals succeeding in STEM.	Positive role models break stereotypes and inspire participation.
2. Ensure Visual and Content Accessibility: Adopt inclusive communication guidelines, such as diverse imagery, subtitles, gender-neutral language, and accessibility features.	Visual representation helps normalize diversity and increase engagement.
3. Target Strategically: Segment audiences to include Girls and young women; women in career transition; teachers, parents, and mentors; minorities; person with migrant background; LGBTQIA+, and persons with disabilities	Tailored content is more impactful and relatable.
4. Partner with Influencers and Role Models: Engage inclusive STEM ambassadors and influencers to broaden outreach.	Influencers are trusted voices, especially among younger and marginalized groups.
5. Encourage Active Engagement: Fund interactive content, such as challenges, quizzes, Q&As, and live talks with women in STEM.	Active participation enhances retention and identification with the message.



6. Connect Campaigns with Real Opportunities: Link communication efforts with free courses, scholarships, and mentoring programs.	Practical pathways increase motivation and reduce barriers to access.
7. Measure Impact and Adapt: Implement tools to track campaign reach, engagement, and actual behavioural change.	Evidence-based strategies improve effectiveness and justify policy investment.
8. Apply an Intersectional and Long-Term Approach: Embed social media campaigns within broader, sustained inclusion strategies that consider overlapping disadvantages.	Inclusive STEM education requires continuous, nuanced, and multi-dimensional action.
9. Utilize Infographics to Communicate Data Effectively: Encourage the use of infographics in social media campaigns to present complex STEM data in a clear, engaging, and accessible format.	Infographics can boost social media engagement compared to text-only content; by simplifying complex data, infographics make STEM topics more approachable, especially for underrepresented groups.

6. Improving Training programs and Learning opportunities

Scaling Up inclusive Summer academies (T5.5 - Summer academy)

STEM summer schools targeted at girls in the critical age range of 15–17 can play a transformative role in promoting gender equity in science, technology, engineering, and mathematics. This is a pivotal stage when many young people begin to form concrete ideas about their educational and professional futures.

However, persistent stereotypes and a lack of exposure to inclusive, hands-on learning opportunities often discourage girls from pursuing STEM pathways. Tailored summer programs offer a strategic response. They provide a safe, inspiring space to explore scientific subjects, meet role models, and gain confidence.

- **Investing in Confidence-Building Experiences** such as STEM summer schools designed specifically for girls at key decision-making ages, with hands-on learning that builds self-efficacy in scientific subjects help counter internalized stereotypes and increase girls' confidence in their STEM abilities—key factors influencing educational and career choices.
- **Ensuring exposure to diverse female role models:** include women scientists, engineers, and technologists as mentors and guest speakers in summer



programs. In this context, representation is crucial: seeing women succeed in STEM as a "good model" makes such careers feel more accessible and realistic for girls.

- **Create Peer support networks:** design summer schools that foster collaboration and relationship-building among participants with shared interests. In fact, peer communities reduce the isolation often felt by girls interested in STEM and support long-term engagement.
- **Emphasizing Real-World applications of STEM:** integrate labs, site visits in enterprises, and real-life problem-solving into summer school curricula, demonstrating how STEM skills apply in the real world increases relevance and motivation, helping girls envision their future paths.
- **Support informed Career orientation:** use summer schools as a space for career guidance, linking STEM fields with meaningful, socially impactful futures. Timely, gender-sensitive guidance helps girls make empowered educational decisions aligned with their interests and values.
- Actively challenge Gender Stereotypes **designing communication and content with a gender-inclusive lens**, avoiding implicit biases and promoting diverse narratives of success. In this regard, STEM summer schools are an opportunity to reshape perceptions and normalize the presence of girls in technical and scientific domains.
- **To sustain high visibility and proactive recruitment of female STEM professionals** as educators and role models, enhancing representation and promoting a supportive learning environment, reflective of SECOVE's successful engagement strategy.
- **To design flexible training schedules and modular program structures** that support diverse learner profiles and encourage equitable access, particularly benefiting individuals balancing professional, educational, and personal responsibilities.

7. Conclusion and Call to action

The importance of systematic, long-term commitment to inclusive VET

Ensuring inclusion in STEM-related vocational education and training for girls and disadvantaged groups requires structural transformation and not isolated or temporary initiatives.

Evidence from the SECOVE activities, best practices and research on this topic highlight the need for a comprehensive and sustained approach involving policymakers, VET operators, companies, and communities.



A long-term commitment must be underpinned by sustained investment, continuous teacher training, personalized guidance, and an educational culture that actively counters gender and socio-economic stereotypes.

Central to this effort is the recognition of intersectionality, understanding that individuals may face overlapping and interdependent systems of discrimination or disadvantage based on gender, ethnicity, disability, socio-economic status, and other factors. Inclusive VET must address these complexities holistically.

Moreover, early childhood education plays an essential role. Research shows that children begin internalizing gender roles and self-perceptions of competence in STEM from a young age. Promoting gender-neutral pedagogies, diverse role models, and curiosity-driven exploration in early education is essential.



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WP5. MAKING SECOVE INCLUSIVE AND ENCOURAGING WOMEN IN TECHNICAL PROFESSIONS

D5.3. Policy Recommendations for Inclusive and Attractive VET in Sustainable Energy

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Abbreviations and Acronyms

VET	Vocational Education and Training
STEM	Science, Technology, Engineering and Mathematics
EIGE	European Institute for Gender Equality
WP	Work Package
EACEA	European Education and Culture Executive Agency
AI	Artificial Intelligence
ESF+	European Social Funds Plus
IT	Information Technology

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1. Introduction

Accessibility, attractiveness, and inclusiveness remain unmet challenges in STEM education and industry. Despite solid evidence that **women possess the skills and competencies needed to succeed in STEM fields**, the sector still suffers from **significant gender imbalances, particularly in areas tied to sustainable industries**.

Research points to a **complex interplay of social, cultural, and institutional factors, combined with personal motivations and values**, which continue to **limit young women's participation in STEM**. Even though **opportunities for women in science, technology, engineering, and mathematics are greater today than ever before**, **persistent systemic, social, and cultural barriers remain unresolved by academia, industry, and governments**. These barriers **reinforce gender disparities across the STEM landscape**.

In **Greece**, while **recent years have seen a gradual rise in the number of girls and women entering VET and STEM**, **gender gaps continue to be stark**. EIGE's 2019 research showed that while **men accounted for 20% of STEM professionals**, **women represented just 4%**. This highlights that **gender inclusion is still an ongoing challenge that will likely extend over the coming decades**.

The present document presents **policy recommendations designed to guide local, regional, and European initiatives of Greece toward enhancing the attractiveness and inclusiveness of VET for girls/women**. It specifically focuses on **male-dominated sectors while promoting excellence within the VET system**. These recommendations are part of **SECOVE's WP5 – Making SECOVE Inclusive and Encouraging Women in Technical Professions**, a holistic and integrated initiative that **acknowledges the importance of diverse educational and professional environments for driving sustainable and innovative development**.

2. Strengthening data collection and policy monitoring

2.1. Enhancing research on inclusivity in VET (T5.1. – National Research)

The activity **T5.1 Enhancing research on inclusivity in VET** was structured with the objective of investigating the inclusiveness and attractiveness of VET in the participating countries and, more broadly, in Europe. The primary focus was on assessing how inclusive VET education in sustainable energy is, particularly for women, and identifying strategies to increase the inclusiveness and attractiveness of VET.



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The methodology behind the Greek national research includes a combination of **desk research, surveys, and interviews/focus groups**, designed to gather both quantitative and qualitative data to provide a comprehensive analysis of the current state of VET in sustainable energy in Greece, with a particular focus on inclusivity and attractiveness for girls/women.

2.1.1 Key-findings on inclusivity of VET in Greece

In Greece, VET continues to face a **deep-rooted social stigma**, being perceived by many as a '**last resort**' **educational path** for students with lower academic performance or behavioral difficulties. This perception is particularly strong among parents, who prefer general upper secondary education as it provides access to university studies. Consequently, VET suffers from relatively **low enrollment rates**, which vary **between 20% and 34%** depending on the region, alongside alarmingly **high early school leaving rates** that can reach up to **20.3%**.

A significant gender gap persists within the VET system. According to 2022 data, **63%** of students in vocational centers at secondary education level were **male**, while only **37%** were **female**. This imbalance is even more pronounced in technical and engineering fields, where male dominance is overwhelming. Stereotypes that associate these professions with men continue to discourage girls/women from enrolling in VET, especially in sectors such as sustainable energy, where female representation remains very limited. **The limited diversity of vocational specializations and the persistence of traditional gender roles** further undermine the appeal of VET for women, reducing their access to emerging and high-demand sectors.

2.1.2 Recommendation for gender inclusion in STEM education and professionalization

In light of the aforementioned findings, we propose the following recommendations for both VET providers and policymakers in Greece:

- First, it is essential to **reposition VET as an equally prestigious and valuable educational pathway**. Public awareness campaigns should target not only students but also parents and the broader community, showcasing success stories of VET graduates and viable career paths they can pursue, including access to higher education and well-paid employment opportunities.
- Second, the **provision of gender-sensitive career guidance** is also crucial. Career counseling services need to challenge entrenched gender stereotypes and encourage both girls and boys to explore a wider range of vocational options, including technical and sustainable energy sectors. These services should ideally be introduced before students make critical decisions regarding their secondary education pathways.



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- Moreover, to encourage more women to pursue careers in technical fields, it is highly recommended that **organizations should offer dedicated programs, workshops, and mentoring initiatives**. These should feature female role models from VET-related professions to inspire and empower young women to follow similar paths. Additionally, VET curricula should be modernized to integrate soft skills and promote lifelong learning, which would not only enhance employability but also broaden the appeal of VET for diverse groups, including women.
- Last but not least, **building networks and partnerships between VET institutions, industries, and organizations promoting gender equality and inclusion** is considered vital. Such collaborations can foster more inclusive and supportive learning environments. Systematic collection and analysis of gender-disaggregated data on participation, early leaving, and employment outcomes are also necessary to inform policies and track progress in addressing these inequalities.

2.2. Improving the role of national observatories (T5.2. National observatory)

The SECOVE observatory on inclusiveness and attractiveness of VET is available on the [project's portal](#). The observatory is dedicated to **promoting inclusive educational and professional practices**. Its primary goal is to ensure that the principles of inclusivity and equity are integrated into the project's activities and outcomes, contributing to a learning and working environment that embraces and values diversity. In this regard, it includes **learning and teaching resources for teachers, trainers, counsellors and VET organizations**. 5 national observatories are established across **Greece, Italy, Portugal, Slovakia and Spain**.

The Greek observatory outlines the **current situation and challenges around gender equality in VET, especially in the STEM and renewable energy sector**. The main objectives of the Greek observatory is to:

- **Report the barriers** that girls/women face when it comes VET and STEM fields.
- **Increase the participation** of girls/women in STEM and VET in Greece.
- **Identify and promote good practices** that enhance the inclusion and attractiveness of STEM and VET for girls/women.

The Greek observatory's activities are aimed at:

- **Analyzing the current situation of girls/women's participation** in VET and STEM in Greece.
- **Organizing summer schools in Athens**, targeted at female VET students, to empower them.



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- **Implementing awareness-raising campaigns** addressed to VET providers, businesses, policy makers and other stakeholders in STEM.
- **Identifying good practices** that promote attractiveness and inclusion in VET and STEM.
- **Defining indicators for the participation of girls/women in STEM** in the Greek educational institutions that participate in the SECOVE project (University of West Attica, School of Higher Vocational Education Delta 360, Thematic School of Higher Vocational Education of Egaleo).

The Observatory includes sources that are useful for tracking the current situation of girls/women in VET and STEM in Greece. The sources consist of:

- **Reports on the participation rates of girls/women in STEM** of the educational organizations that participate in the SECOVE project.
- **Publications** around girls/women's participation in VET and STEM in Greece
- **Videos**
- **External websites focusing on initiatives** with the aim of strengthening women's participation in the aforementioned sectors
- The Observatory's **Facebook feed**
- **Articles** on the importance of women's participation in STEM and VET.

3. Enhancing stakeholder engagement and public awareness

3.1. Strengthening stakeholder engagement in policy development (T5.3. Stakeholders' workshops)

Engaging stakeholders is of crucial importance when it comes to promoting inclusivity. Within the SECOVE project, stakeholders' workshops were organized to foster a shared, critical understanding of the challenges, opportunities, and potential policy interventions needed to improve the inclusiveness and effectiveness of VET in the renewable energy sector. These workshops also **promoted collaborations and created synergies between business, education, and policy sectors, strengthening the cross-sectoral cooperation** essential for impactful change.

3.1.1 Stakeholders' workshops in Greece

In Greece, **three stakeholders'** workshops were organized which engaged a total of **26 participants** in a shared dialogue and discussion about **pathways to improve gender inclusion of STEM industry**, particular in the **renewable energy sector**. With this objective in mind, the *Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.*



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workshops followed a **participatory format** to engage participants and gather valuable insights regarding barriers faced by girls/women in accessing VET in sustainable energy and emerging opportunities for inclusion.

Stakeholders' insights

A recurring theme in all three workshops was the recognition of **persistent gender stereotypes that continue to influence the choices and aspirations of young women**. The participants acknowledged that **societal beliefs**, such as men being more physically capable or intellectually superior, are still deeply embedded in the Greek socio-cultural context. While many of the participants themselves reported that they had not experienced direct discrimination within their families or schools, they were keenly aware that **socioeconomic status** and the **educational background of parents** played a significant role in shaping opportunities for girls. In lower-income or less-educated families, gender stereotypes were reported to be more entrenched, creating additional hurdles for girls aspiring to enter male-dominated professions.

Another significant issue raised was the **double burden faced by women in combining career and family responsibilities**. The participants shared that women are often expected to prioritize caregiving and family duties over professional ambitions, a challenge rarely discussed or posed to their male counterparts. This societal expectation not only influences personal choices but also reinforces barriers to entering and thriving in technical professions. For example, in the discussion around naval engineering, participants noted that such professions, which often involve night shifts, fieldwork in male-dominated environments, or relocation abroad, were perceived as unsuitable or challenging for women. Moreover, women are often expected to **possess more qualifications and continuously prove themselves to achieve positions equal to those of their male peers**.

Key recommendations

The workshops highlighted several facilitating factors that can support girls/women in overcoming these challenges:

- First, **education institutions**, especially schools, were seen as playing a **pivotal role** by providing better vocational guidance, presenting diverse career paths, and offering psychological support that fosters soft skills and resilience. The participants emphasized the need for teachers and counselors to encourage and support students' dreams, even when these choices deviate from traditional expectations. Encouraging girls to study or work abroad was cited as a powerful way to broaden their perspectives and professional horizons.



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- Second, **family support** emerged as another essential enabler. The participants underlined the importance of equal participation of men and women in household duties and child-rearing, as well as the vital support from extended family members, such as grandparents. Equally, the support of partners was described as critical in enabling women to pursue demanding careers in technical fields.
- Third, the workshops underlined that **economic and social factors**, such as the educational attainment and financial stability of the family, significantly impact career choices for young girls. The participants stressed that improving these conditions could create a more enabling environment for women to pursue technical and STEM-related professions.

3.2. Enhancing awareness campaigns for VET inclusion (T5.4. Awareness campaigns)

The underrepresentation of girls/women in STEM constitutes a complex issue which is rooted in **structural and systemic barriers** that hinder women's inclusion and progress toward gender equality in the sector. **Gender roles, discrimination, and the absence of robust inclusion policies** further limit women's participation in STEM education and careers, especially in leadership and decision-making roles.

Looking at both national and EU contexts, it is clear that efforts must go beyond simply making technical professions more attractive to women. There is a need for **broader awareness-raising and public education on the gender gap in STEM**, alongside structural reforms in education and labor policies to foster inclusion of women in these fields.

Communication is pivotal in raising awareness of gender inequality and driving reforms within STEM practices. In this landscape, **social media channels** have become powerful tools to **sensitize, inform, educate, and advocate for systemic change**. Media can significantly influence students' interest in STEM careers.

3.2.1. Social media awareness-raising campaigns in Greece

In Greece, the awareness-raising campaigns in social media started from **October 2024** and they are expected to last until **June 2025**. The platform chosen was **Facebook** and each post was scheduled to be uploaded every Thursday, at 12 pm local time. The posts were then shared on the **SECOVE Greek Community** Facebook group to maximize impact among stakeholders. The campaign targeted **VET stakeholders, companies, associations, NGOs, public bodies, and**



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educational/training organizations, and was structured around key thematic messages, graphics, and interactive posts. Each month was dedicated to a specific thematic:

- In **October 2024**, the campaigns focused on introducing the **current gender gap in STEM, renewable energy, and VET**. This initial phase set the stage by presenting facts and figures, and by highlighting available VET programs and pathways that women can pursue, especially in renewable energy fields.
- In **November 2024**, the campaign **tackled gender stereotypes head-on, using myth-busting posts and facts** to challenge common misconceptions about women's roles in science and technology. It also showcased how societal perceptions of STEM as a male-dominated domain are evolving towards greater inclusivity.
- In **December 2024**, the campaign shifted the focus to early education, underlining the importance of **introducing STEM concepts to girls from a young age**. It presented existing programs that support girls' engagement in STEM and offered strategies to make STEM education more engaging, accessible, and fun for girls.
- Entering **January 2025**, the campaign highlighted **inclusivity and access to VET for women**. This phase emphasized the benefits of VET for women in technical fields, explored how VET programs are becoming more inclusive, flexible, and accessible to diverse female audiences, and addressed pathways for women to enter and succeed in technical professions.
- In **February 2025**, the campaign introduced **role models and the importance of mentorship for women in STEM**. It focused on presenting female leaders, mentors, and pioneers, showcasing how they have paved the way and can inspire the next generation of girls to pursue careers in STEM and technical professions.
- The theme for **March 2025** centered on celebrating **women pioneers in STEM and renewable energy**. It included posts about historic female figures in these fields, as well as the importance of women leaders heading VET institutions or initiatives promoting gender equality in STEM and energy sectors.
- In **April 2025**, the campaign moved towards the **future of green jobs and skills for women**, providing an overview of emerging green jobs in renewable energy and the essential role of women in this sector. It also showcased green digital tools that women can learn through VET programs, emphasizing the urgency and opportunities for women to join the green economy.
- **May 2025** was dedicated to **digital skills for women in VET**, highlighting technological tools and digital platforms that empower women in STEM and emerging technologies. This phase will also address how digital learning can help overcome barriers faced by women in technical education and careers.
- In **June 2025**, the campaign will conclude with **motivational posts featuring career success stories**. It will present young women who have completed VET programs and



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successfully entered STEM and renewable energy careers, aiming to inspire and encourage more girls to see these pathways as viable and rewarding.

3.2.2. Impact of the awareness-raising campaigns

From October 2024 till April 2025, the posts collectively reached over **8,000 users**, based on individual post reach data, and generated hundreds of reactions, shares, and comments. The posts addressed critical issues such as **gender stereotypes in STEM and VET, the importance of female role models and mentors, the relevance of women's participation in green energy sectors, and debunking myths about women's interests and abilities in technology and science**. The campaign also leveraged **international dates and events**, such as the **International Day of Women and Girls in Science (11 February 2025)**.

Through this period, the campaign managed to **raise awareness among hundreds of Greek VET and STEM stakeholders**. It highlighted **key gender gaps and provided data-driven messages** to challenge stereotypes, while it also promoted the visibility of **female role models and success stories in technical professions**. Overall, the awareness-raising campaign has been able to support SECOVE's **mission to increase the attractiveness of VET for girls and women**.

4. Improving training programs and learning opportunities (T5.5 Summer Academy)

4.1. Overview of the Greek Summer Academy

The Greek summer academy ***SHE Creates: STEM Edition*** was organised from **17 to 29 June 2024**. The academy was held at the project's educational institutions with the aim of encouraging girls to pursue careers in STEM.

In total, **60 girls** participated in the summer academy. During the training, the participants had the opportunity to **become familiar with STEM concepts and develop their critical thinking and problem-solving skills**. They were able to **boost their confidence and self-esteem** through the mentoring sessions that were organised, while enriching their knowledge in STEM. At the end of the training, the participants were offered the chance to **broaden their future options** thanks to the knowledge and skills they developed and through the networking and mentoring opportunities.

4.2. Program

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4.1.2. University of West Attica

The summer school held at the University of West Attica focused on **natural sciences, energy and digital technologies**. The agenda included **study visits to electric vehicle charging stations and gas cogeneration plants**, as well as **lectures on electromobility, renewable energy and astrophysics**. In addition, **concepts of algorithmic and mathematical thinking** were addressed, following an **experiential and interdisciplinary approach**.

4.1.3. Thematic School of Vocational Education of Egaleo

The summer school held at the Thematic School of Vocational Education of Egaleo focused on **digital transformation, sustainability, new technologies and the empowerment of women in technical professions**. The participants were introduced to the topics of **social media and digital marketing for sustainability, the Internet of Things through the concept of "smart home", and robotics with applications in water saving**. At the same time, **circular economy, applied research, and environmental challenges** were highlighted, linking theory with practical applications. Particular emphasis was placed on the **role of women in AI, sustainable energy and social change**, as well as on **career paths in technical professions**, encouraging equality and inclusion.

4.1.4. Thematic School of Vocational Education DELTA 360

The summer school held at the Thematic School of Vocational Education DELTA 360 focused on **practical and professional activities**. The participants were informed about the **educational system in Greece, the possibilities of studying at vocational institutes**, as well as about specializations in the fields of **health, beauty, IT and arts**. Themes were also presented on the **use of AI in technical professions, the dangers of the indiscriminate use of new technologies and their integration into everyday life**. **Career guidance** had a special place in the agenda, with an emphasis on the **prejudices and stereotypes** faced by women in STEAM fields and the need for their participation in these fields. SAEK DELTA 360 also offered a guided tour on its laboratories, as well as information on internships and apprenticeships it organizes.

5. Implementation and future directions (T5.6. Policy recommendation)

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To effectively address gender disparities in VET and promote the inclusion of women in STEM and renewable energy sectors, **policy interventions must operate simultaneously at local, regional, and European levels**. Building on the insights from stakeholder workshops, awareness campaigns, summer academies and institutional reviews, a cohesive set of policy recommendations can be formulated to support a systemic and sustainable transformation of VET systems toward greater inclusivity.

Greece presents a unique context where VET continues to suffer from **low societal prestige, entrenched gender stereotypes, and underrepresentation of women in technical and scientific sectors**. Effective policy solutions must therefore operate across local, regional, and European levels, with a specific emphasis on **reshaping perceptions, reforming systems, and expanding opportunities for girls and women in VET and STEM**.

5.1. Local level

At local level, policy interventions should focus on **dismantling the stigma attached to VET and challenging deep-rooted cultural stereotypes about gender and career choices**. Schools and vocational institutions should be supported to integrate **gender-sensitive career guidance services, beginning as early as lower secondary education**. These services must actively encourage girls to explore non-traditional career paths, including those in engineering, information technology, and green energy. Teachers and counselors must be trained to **avoid reinforcing stereotypes and instead adopt inclusive pedagogical approaches**. Local campaigns involving parents, educators, and local media can also help **shift perceptions by showcasing the success of female VET graduates and highlighting the relevance of technical education to emerging sectors**. Moreover, **increasing the presence of female role models**, through talks, mentorship programs, and alumni networks, can offer relatable inspiration for young girls contemplating a future in STEM.

5.2. Regional level

At regional level, Greek authorities should facilitate **partnerships between VET institutions, regional education departments, industries, and civil society organizations** to build more inclusive and responsive training ecosystems. Regional educational planning should be informed by labor market needs while ensuring that these needs **are not defined in gender-biased terms**. **Investment in regional VET infrastructure** is crucial, particularly in rural and disadvantaged areas, to guarantee that women have equal access to high-quality training environments. **Targeted support**, such as transportation subsidies, childcare provisions, and flexible scheduling, should be introduced to make VET more accessible to women balancing education with other

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responsibilities. Furthermore, the **systematic collection and use of sex-disaggregated data** the regional level will help monitor progress and shape more effective policies tailored to local realities.

5.3. National level

At national level, the Greek Ministry of Education and Ministry of Labor should coordinate efforts to **embed gender equality across the VET reform agenda**. While recent legislative changes have been aimed at modernizing the VET system and improving links with the labor market, these reforms must explicitly incorporate **gender inclusion as a core objective**. National frameworks should include **clear gender equality indicators**, and public reporting mechanisms should be established to ensure **transparency and accountability**. National curricula for VET programs should include content that **promotes gender awareness and reflects the contributions of women in technical professions**. **Collaboration with national organizations that promote gender equality**, such as the General Secretariat for Demographic and Family Policy and Gender Equality, can help align educational reforms with broader social policy goals.

5.4. European level

At European level, Greece should continue to actively **engage in EU-supported initiatives that promote the inclusion of women in VET and STEM**, as well as in the green and digital transition. Participation in Erasmus+ projects and European networks offer valuable opportunities to **exchange best practices, pilot inclusive models, and scale successful interventions**. Greek policymakers should leverage European funding, such as the ESF+, to **invest in gender-sensitive VET programs and infrastructure**. Greece should also **support efforts at the EU level to mainstream gender across all digital and green skills strategies**, ensuring that women are not left behind in key areas of innovation and sustainability.

6. Conclusion and call to action

Achieving gender equality in VET and STEM in Greece requires a transformative, multi-level approach that addresses both structural barriers and cultural perceptions. The underrepresentation of women in technical fields is not merely a reflection of personal choice, but a **consequence of long-standing stereotypes, institutional gaps, and limited access to inclusive guidance and role models**. The insights from the awareness campaigns, stakeholder workshops, summer academies and grassroots initiatives clearly show that **progress is possible**

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when inclusive policies are backed by coordinated efforts, targeted investments, and a strong societal commitment to change.

Greece stands at a **pivotal moment**, with opportunities emerging from the green and digital transitions, and with European support available to accelerate reform. It is vital that educational institutions, policymakers, civil society organizations, and industry stakeholders act together to reshape the narrative around VET and STEM. Girls and women must be empowered not only to enter these fields but to thrive within them, supported by systems that recognize their potential, remove structural obstacles, and celebrate their achievements.

All relevant stakeholders are called to act. Educational leaders should prioritize inclusive curriculum design and equitable guidance. Policymakers must ensure that gender equality is a measurable objective in VET reforms. Employers and industry representatives are urged to support gender-balanced recruitment and training opportunities. Finally, European institutions and funding programs should continue to incentivize and support national efforts aimed at eliminating gender gaps in technical education and employment.

The time to act is now, ensuring that VET becomes a key driver of gender equality, social inclusion, and economic resilience in Greece and across Europe.

Policy Recommendations for Inclusive and Attractive VET in Sustainable Energy – Slovakia (T5.6)

Purpose of the Policy Recommendations

The purpose of these recommendations is to support the development of inclusive and attractive vocational education and training (VET) in Slovakia, specifically in the context of sustainable energy. The focus is on improving gender balance, supporting underrepresented groups, and enhancing the overall inclusivity and relevance of VET through the SECOVE project.

Link to SECOVE Project Objectives

The SECOVE project seeks to enhance Centres of Vocational Excellence (CoVEs) in the field of sustainable energy. These recommendations align with SECOVE's commitment to excellence, inclusion, and innovation in VET by addressing gender disparities, intersectional disadvantages, and promoting equal access and opportunity.

1 Strengthening Data Collection and Policy Monitoring

1.1 Enhancing research on inclusivity in VET

1. General Context and VET Landscape

Slovakia has a strong tradition in vocational education and training (VET), with around 68% of upper secondary students enrolled in vocational tracks, well above the OECD average. The VET system includes various school types, such as secondary vocational schools, industrial schools, and academies, offering programs in diverse disciplines, including technical and economic fields.

Despite this strength, there is a steady decline in student numbers in VET institutions, driven by demographic trends and changing preferences. Technical fields are particularly affected, with decreasing interest among students, especially females, in traditionally male-dominated STEM subjects.

Women make up approximately 48.5% of VET students, but their representation is uneven across disciplines. In technical sciences at the university level, only 22.8% of students are female, indicating ongoing gender disparities, despite Slovakia achieving full gender parity (1.0) in educational attainment according to the Global Gender Gap Index.

2. Barriers to Inclusion in STEM and Sustainable Energy Fields

The report identifies several barriers to inclusion and gender equity in STEM, particularly in sustainable energy sectors:

- Gender stereotypes and societal expectations influence girls' interests in STEM from as early as age 12.

- Gender bias in early education: Some educators underestimate girls' math abilities, encouraging them, either openly or tacitly, to abandon their STEM ambitions.
- A lack of female role models, and internalized biases undermine girls' confidence in technical subjects.
- Lack of motivation at home and at school, low family and teacher encouragement as well as the capture of talent at a young age.
- STEM subjects are still seen as “male” domains, by students, some educators and employers.
- There is limited representation of minority or non-Western voices in curricula and classroom discussions.
- Public spaces and classroom environments are not always inclusive, especially for non-binary individuals and students with disabilities.

While there are several university programs that include elements of sustainable energy (e.g., at TU Košice, Comenius University, and University of Žilina), dedicated VET programs in this field are lacking, limiting early exposure to the green transition.

3. Institutional and Policy Developments

Recent national strategies show increasing attention to inclusiveness:

- The 2030 Strategy for Inclusive Education, implemented through an action plan (2022–2024), emphasizes desegregation, accessibility, teacher training, and inclusion of Ukrainian students.
- A new Department of Inclusive Education was established at the Slovak Ministry of Education.
- Scholarship schemes for socio-economically disadvantaged students and reforms in higher education support broader access.

However, monitoring tools, financial frameworks, and consistent application of policies remain areas for improvement.

4. Stakeholder Perspectives (Surveys and Focus Groups)

VET Teachers and Experts (91 respondents):

- Most respondents reject the notion that male students are inherently better at STEM.
- They cite individual motivation, upbringing, stereotypes, and lack of exposure as key factors affecting girls' participation.
- Female students are perceived as more diligent, but discouraged by social norms and expectations.
- Teachers advocate for more role models, career counselling, modern methods, and practical teaching.

Students (396 respondents):

- 43% of girls consider pursuing a STEM career; many are motivated by meritocratic values and job potential.
- Discrimination is experienced by some, particularly in teacher attitudes and infrastructure.
- Students suggest curriculum modernization, better facilities, more practice-oriented teaching, and stronger career guidance as key improvements.

Focus Groups:

- Secondary and university students emphasized the importance of modern, relevant education and inclusive school environments.
- Discrimination based on gender or sexual orientation still exists, often unaddressed.
- Teachers and students recommend anonymous feedback, cross-gender curriculum naming, and better collaboration with families and communities to reduce stereotypes and increase inclusivity.

5. Key Takeaways and Recommendations

- STEM inclusivity remains a major challenge, especially for girls and underrepresented groups.
- There is a need for more systemic efforts, including national data collection, support for inclusive school practices, and stronger links between VET and sustainable energy sectors.
- Teachers, students, and experts alike call for role models, modernized methods, and accessible infrastructure.
- The lack of dedicated VET programs in sustainable energy is a key gap.
- More attention must be paid to the voices of non-binary and minority students, and public spaces must be more inclusive.

According to national research findings, while there is no strong gender imbalance in overall VET participation in Slovakia, there is a significant underrepresentation of women in technical STEM fields, with only 22.8% of women studying technical sciences. Qualitative findings highlight that gender stereotypes and socialization processes often influence girls' decisions starting from the age of 12, which has a long-term impact on their academic and career choices in STEM. To address these challenges, it is critical to collect and analyze disaggregated data on gender, socio-economic background, ethnicity, and disability. Such data can help identify barriers to access and track performance disparities. Moreover, the planning and development of inclusive VET programs should be informed by the lived experiences and perspectives of marginalized groups, ensuring that real barriers and opportunities are reflected in institutional strategies and national policies.

1.2 Improving the role of National Observatories

NA

2 Enhancing Stakeholder Engagement and Public Awareness

Strengthening stakeholder engagement in policy development (T5.3 - Stakeholders workshops)

- VET institutions, employers, and NGOs need to collaborate more closely in developing inclusive strategies.
- Themes raised during workshops include the lack of role models, importance of mentorship, and gender-sensitive teaching methods.
- Establishing regional stakeholder platforms can enhance dialogue and practical cooperation.

Enhancing awareness campaigns for VET inclusion (T5.4 - Awareness campaigns)

- Campaigns in Slovakia addresses persistent gender stereotypes, promote STEM careers for girls and women, and highlight inclusive learning environments.
- Effective strategies include showcasing female leaders, inclusive teaching spaces, and success stories.
- Campaigns must also target educators and families to reshape cultural expectations and support student choice.

3 Improving Training Programs and Learning Opportunities

Scaling up inclusive summer academies (T5.5 - Summer academy)

- Slovakia's pilot summer academy attracted students of diverse profiles and focused on hands-on learning and gender balance.
- Future training should continue to promote inclusive access, particularly for girls and minorities.
- Modular and flexible learning paths can help engage learners with different needs and backgrounds.
- Feedback from participants emphasized the importance of supportive mentors and role models.

4 Implementation and Future Directions

To successfully implement the proposed policy recommendations for inclusive and attractive VET in sustainable energy, Slovakia needs a structured, multi-level action plan involving national authorities, regional stakeholders, educational institutions, and employers. This action plan is tailored to Slovakia's institutional and regional context. It balances national policy leadership with local flexibility, and supports both systemic reforms and practical innovations at the school level. Its success will depend on cooperation across sectors, adequate funding, and sustained political commitment to ensuring that every learner in Slovakia, regardless of background, has a fair and supported pathway into the sustainable energy workforce of the future.

The actions/recommendations provided below are the solid basis for a roadmap towards a systemic change.

4.1 National-level leadership and policy alignment – recommendations

The Ministry of Education, Science, Research and Sport of the Slovak Republic, in collaboration with ŠIOV (State Institute of Vocational Education), should take the lead in integrating inclusion goals into the National VET Strategy and related policies. This includes:

- Updating and alignment of all relevant national strategic documents and frameworks in technical and green sectors to:
 - Explicitly integrate inclusion objectives related to gender, socio-economic background, ethnic minorities, and learners with disabilities.

- Highlight STEM and sustainable energy as priority sectors for inclusive skills development.
- Embed measurable targets and indicators for participation and progression of underrepresented groups.
- Mandating the systematic collection, analysis, and use of disaggregated data (by gender, socio-economic background, ethnicity, geographic location, and special needs) in:
 - VET enrolment and completion rates
 - Apprenticeship and employment outcomes in STEM and sustainable energy
 - Funding allocations and support programs. Ensure this data informs annual reporting, policy revisions, and targeted interventions.
- Coordinating sustained, inclusive national campaigns co-branded with regional/local actors to:
 - Promote inspiring role models from diverse backgrounds in STEM and sustainable energy
 - Highlight emerging green jobs and pathways through VET
 - Are adapted for different audiences (e.g., young girls, Roma youth, rural learners, learners with disabilities)
 - Utilize digital platforms, school visits, and mainstream media.

4.2 Regional & local-level recommendations action plan

Build institutional capacity for inclusive education in VET schools

- Embed inclusive and gender-sensitive pedagogy into teacher training: Develop regional-level professional development hubs or partnerships (e.g., with pedagogical universities or NGOs) to deliver training on:
 - Inclusive teaching strategies
 - Gender-sensitive and culturally responsive pedagogy
 - Support for learners with special educational needs in STEM contexts.
- Appoint Inclusion coordinators in chosen VET schools:
 - Provide regional funding or reallocate resources to support dedicated inclusion roles.
 - Ensure coordinators receive specialized training and participate in regional peer-learning networks.
- Support the development of school-level inclusion action plans:
 - Align with national strategic goals, but tailor to regional labour market specifics.
 - Include targets on enrolment and success of underrepresented groups in STEM/energy tracks.
 - Encourage community engagement and feedback from students and parents.

Drive early engagement of girls in STEM

- Launch regional “Girls in Green Tech” outreach programs:
 - Partner VET schools with local basic schools (ages 10–15) to organize workshops, lab days, and talks by women in STEM/sustainable energy.
 - Focus on curiosity, creativity, and the real-world impact of STEM solutions on climate, energy, and society.
- Support school-level STEM clubs or challenge projects targeting girls:
 - Offer mini-grants or kits to schools for hands-on, inquiry-based activities.
 - Involve female mentors or ambassadors from regional industry or universities.
- Train VET and basic school staff in early STEM encouragement techniques:
 - Include strategies to counteract gender bias and stereotype threat.
 - Provide easy-to-use resource packs for interactive classroom use.

Strengthen regional ecosystems of cooperation

- Establish or revitalize Regional VET Partnerships:
 - Include employers, local governments, labour offices, civil society, and VET providers.
 - Coordinate efforts to align training offers with green/energy transition needs and to ensure inclusion targets are embedded.
- Encourage Local Labour Market Alignment:
 - Use regional data (e.g. skills shortages, energy transition plans) to guide the development of new STEM/green study tracks in VET schools.
 - Facilitate employer input into curriculum design and offer local apprenticeships and mentoring programs for underrepresented learners.

Provide tailored regional support & incentives

- Pilot Regional Inclusion Innovation Grants: Competitive grants for VET providers or local consortia to:
 - Test new inclusion models;
 - Adapt facilities to meet accessibility standards;
 - Develop region-specific promotional materials
- Recognize and Celebrate Inclusive Practice:
 - Organize regional awards or certifications for schools and employers who demonstrate leadership in inclusive VET for STEM/sustainable energy.

Monitor and adapt

- Create Regional Dashboards on Inclusion in STEM VET:
 - Track enrolment and outcomes by target groups;
 - Feed data into national systems;
 - Use insights to adapt interventions and celebrate successes.
- Enable Bottom-Up Feedback Loops:
 - Hold regular regional forums or school-community roundtables;
 - Empower students, especially those from underrepresented backgrounds, to voice their needs and solutions.

4.3 Strengthening Stakeholder Engagement and Governance

Establish and activate regional multi-stakeholder advisory platforms

- Create formalized Regional VET Inclusion and Innovation Councils, composed of:
 - VET school leaders and teachers;
 - Employers (especially from sustainable energy and green sectors);
 - Local and regional government representatives;
 - NGOs focused on education, inclusion, youth, and minority rights;
 - Student and parent representatives.
- Ensure councils meet at least twice per year to:
 - Review progress on inclusion targets;
 - Exchange best practices and success stories;
 - Address new labour market trends and adjust training offers accordingly;
 - Recommend policy and funding adjustments at regional/national level.

Involve students and civil society in VET co-design

- Mandate structured participation mechanisms within VET schools (e.g., advisory boards, focus groups, student panels) to:
 - Engage students in shaping learning environments and curricula, particularly around STEM and sustainable energy programs.
 - Consult NGOs with expertise in inclusion, gender equality, youth empowerment, and disability support when developing new programs, awareness campaigns, and outreach activities.
- Develop regional toolkits and training for VET institutions on effective stakeholder engagement methodologies.

Empower regional labour offices as catalysts for inclusive skills development

- Strengthen the strategic role of regional labour offices by:
 - Providing targeted training for labour office staff on inclusion and green transition priorities.
 - Equipping labour offices with real-time labour market analysis tools that disaggregate data by gender, age, location, and vulnerability status.
 - Tasking labour offices with coordinating tailored career guidance, pre-apprenticeship opportunities, and re-skilling programs for disadvantaged youth and adults toward STEM and sustainable energy careers.
- Foster close operational links between labour offices, VET institutions, employers, and social services.

5 Structured Multi-Level Action Plan

5.1 National-level actions – setting the systemic framework

Dimension	Key Actions
Strategic policy alignment	- Update national strategies to integrate inclusion in STEM/sustainable energy sectors. - Set measurable inclusion targets.

	- Introduce modular and flexible training pathways, including microcredentials
Equity-driven data monitoring	- Mandate disaggregated data collection (gender, socio-economic status, ethnicity, special needs, geographic location). - Use data to inform annual reporting, targeted interventions, and funding decisions.
Inclusive career campaigns	- Coordinate national campaigns promoting diverse STEM/ green career pathways. - Highlight role models from underrepresented groups.
Multi-stakeholder governance	- Establish a National Taskforce on Inclusive Green Skills. - Foster inter-ministerial cooperation and ensure active participation of employers, educators, civil society, youth representatives.
Sustainable financing	- Dedicate funding for inclusive VET initiatives. - Allocate dedicated funds for inclusion initiatives. - Leverage EU funds (ESF+, Erasmus+, RRF) transparently.
Vet program standards & innovation	- Embed inclusion and sustainability criteria in VET program accreditation. - Require universal design and accessibility principles. - Encourage modular, flexible programs supporting different learning needs.

5.2 Regional/local-level actions – operationalizing and innovating locally

Dimension	Key actions
Institutional capacity building	- Train VET teachers in inclusive, culturally responsive and gender-sensitive pedagogy. - Appoint trained Inclusion Coordinators in VET institutions. - Develop and implement school-level Inclusion Action Plans aligned to regional labour market needs. - Scale up proven inclusion models like SECOVE's summer academies to more VET centres and regions.
Early engagement of girls	- Launch regional "Girls in Green Tech" outreach programs targeting basic schools (ages 10–15). - Organize hands-on STEM activities for girls in basic schools. - Introduce structured mentorship and role model programmes featuring female and minority STEM professionals.
Regional ecosystem cooperation	- Align local VET offers with green transition needs. - Establish/strengthen Regional VET Partnerships (VET providers, employers, municipalities, NGOs). - Foster local apprenticeships, internships, and real-world project collaborations.
Targeted regional support	- Provide inclusion innovation grants for VET institutions and local partnerships. - Recognize schools/employers leading in inclusion and award inclusive schools/employers annually at regional forums.

Data-driven local adaptation	- Develop Regional Inclusion Dashboards to track VET participation and outcomes. - Use dashboard insights to adjust actions and funding locally. - Enable bottom-up feedback mechanisms (student forums, stakeholder roundtables).
Stakeholder engagement and governance	- Establish formal Regional VET Inclusion and Innovation Councils. - Involve student representatives and NGOs in co-designing VET programs and campaigns. - Strengthen the role of regional labour offices to: identify current and future skills gaps, and coordinate career guidance, support, and re-skilling for vulnerable learners

Principles guiding the entire plan:

- system leadership + regional flexibility
- inclusion, equity, diversity at every step
- practical innovation and proven models (scaling successful pilots)
- data-driven planning and transparent monitoring
- cross-sectoral cooperation to ensure sustainable and digital transitions are inclusive.

6 Conclusion and Call to Action

Achieving a truly inclusive vocational education and training (VET) system in Slovakia requires a systematic, long-term commitment that goes beyond individual projects or temporary initiatives. Inclusion must become a core value embedded in national education policy, institutional strategies, curriculum reform, and professional teacher development. In the context of sustainable energy – a sector vital to Slovakia’s green transition and regional development – ensuring equal access to opportunities for all learners is both a social obligation and an economic necessity.

These policy recommendations are specifically tailored to the Slovak context, drawing from national research, stakeholder feedback, and practical insights gathered through the SECOVE project. They reflect the realities of Slovakia’s education system, including the strong presence of VET, regional disparities, low participation of women in technical fields, and the need for improved coordination among actors involved in education, labour, and inclusion.

Despite Slovakia’s steady progress, key challenges remain. Women are still significantly underrepresented in STEM and technical VET programmes. Learners from marginalized groups, including ethnic minorities and rural areas, often face invisible barriers to accessing and succeeding in VET. To ensure Slovakia’s transition to a sustainable economy is truly inclusive, these barriers must be addressed proactively.

6.1 Key policy directions for inclusive and attractive VET in STEM and sustainable energy in Slovakia

- Strengthen national data systems to systematically track and report inclusion outcomes across VET and higher education institutions (by gender, socio-economic background, ethnicity, geographic location, and disability status).
- Promote inclusive pedagogy and mentoring by embedding gender-sensitive, culturally responsive teaching practices and structured mentorship programs within VET schools, higher education institutions (HEIs), and training centres.
- Expand targeted awareness campaigns that actively counter gender and social stereotypes, particularly in technical, STEM, and sustainable energy fields, showcasing diverse role models and emerging career pathways.
- Enhance the strategic role of national institutions such as ŠIOV (State Institute of Vocational Education) in coordinating, monitoring, and advising on the implementation of inclusive VET policies and innovations.
- Establish and strengthen cross-sector partnerships linking VET providers, employers (especially in green sectors), regional and municipal governments, NGOs, labour offices, and student representatives to align skills training with inclusive regional development strategies.

6.2 Next Steps for Advancing Inclusive and Attractive VET in Slovakia

- Pilot the proposed actions in a selected group of VET institutions and regions, rigorously evaluate outcomes, and scale successful models nationally to ensure systemic impact.
- Establish a dedicated national taskforce for inclusive VET, bringing together key ministries, VET providers, schools, employers, civil society organizations, labour offices, and student representatives to coordinate implementation and innovation.
- Mobilize and leverage EU and national funding instruments (e.g., ESF+, Erasmus+, Recovery and Resilience Facility) to sustainably finance structural measures that advance inclusion, innovation, and green transition goals.
- Develop and implement a national evaluation framework that sets clear inclusion targets, defines measurable indicators, and ensures regular monitoring and transparent reporting on progress.

To remain relevant and impactful, these actions must also be responsive to labour market dynamics, particularly those tied to green and digital transitions. Slovakia's VET system must equip all learners – regardless of background – with the skills and confidence to succeed in a changing economy. In order for women in Slovakia to focus more on work and careers in the field of STEM, motivation is needed at home and at school, as well as the capture of talent at a young age. The more favourable working conditions that employers can offer their employees also contribute to this.

We call on Slovak policymakers, VET institutions, employers, and regional actors to work together to translate these recommendations into tangible change. Inclusion must not be a parallel objective – it should be the foundation of quality, innovation, and sustainability in VET for Slovakia's future.



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T5.6 Policy Recommendations for Inclusive and Attractive VET in Sustainable Energy in the Basque Country



POLITEKNIKA
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1. INTRODUCTION

Purpose of the Policy Recommendations

This document presents a set of policy recommendations aimed at promoting a more inclusive and attractive Vocational Education and Training (VET) system in the field of sustainable energy within the Basque Country. It responds to the persistent challenges of underrepresentation—particularly of women and other disadvantaged groups—in STEM-related VET pathways and careers. These recommendations are intended to serve as a practical tool for policymakers, VET providers, and stakeholders involved in educational planning, employment, and regional development.

The aim is to support the regional transition toward a green, digital, and socially just economy by ensuring that VET is accessible, responsive, and engaging for all learners. The recommendations focus on actionable measures that reflect the current needs, values, and opportunities in the Basque context, while being adaptable to future changes in the labor market.

Link to SECOVE Project Objectives

This document is a result of the SECOVE project, funded by the European Union and implemented across several European countries. The project promotes collaboration between VET providers, industry, public institutions, and civil society to build Centers of Vocational Excellence (CoVEs) in the sustainable energy sector.

As the only SECOVE CoVE in the Basque Country, **Politeknika Txorierri** has coordinated regional-level research, workshops, awareness campaigns, and training activities to develop these policy recommendations. The insights are based on fieldwork conducted under the SECOVE Work Package 5 (WP5), which focuses on enhancing inclusiveness and attractiveness in VET, with a particular emphasis on gender equality and the participation of underrepresented groups.

This policy document integrates local research findings, stakeholder input, and pilot experiences—such as inclusive summer academies and awareness campaigns—into a structured set of recommendations. It aligns with ongoing regional strategies, including the Basque VET Plan 2025, the Green Energy Transition Agenda, and the RIS3 Smart Specialization Strategy, and aims to reinforce the Basque Country's leadership in inclusive, innovation-driven VET.

2. STRENGTHENING DATA COLLECTION AND POLICY MONITORING

Enhancing Research on Inclusivity in VET (T5.1 – National Research)

In the Basque Country, advancing the inclusivity of VET in the field of sustainable energy requires a solid evidence base that reflects the regional context, challenges, and opportunities. As part of the SECOVE project, extensive qualitative and quantitative research was carried out involving local VET providers, students, staff, industry representatives, and public institutions.

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The research identified significant gender imbalances in STEM-related VET pathways—mirroring broader national trends where only 13% of students in STEAM fields are women. These imbalances are exacerbated by declining enrolments in technical fields, a lack of qualified professionals in emerging technologies, and persistent socio-cultural stereotypes about technical careers.

The methodology adopted included desk research, stakeholder surveys, and targeted focus groups. Focus groups conducted with students and VET staff revealed barriers to inclusion such as lack of visibility of female role models, limited career guidance in sustainable energy sectors, and insufficient adaptation of teaching practices to diverse learner needs. Additionally, a national workshop with stakeholders (including companies, public institutions, and NGOs) highlighted the need for better alignment between qualification frameworks and the evolving demands of the green and digital labor markets.

Key findings for improving research on inclusivity in VET include:

- **Intersectional Data Collection:** Inclusion strategies must move beyond gender to consider overlapping forms of discrimination—such as socio-economic disadvantage, migration background, and disability. A multidimensional approach is essential for capturing the complexity of exclusion in VET.
- **Localized Evidence:** Research must reflect regional realities, such as the Basque Smart Specialization Strategy and the priorities of the Basque VET Plan, to ensure policy relevance and actionable outcomes.
- **Learner and Staff Voices:** Engaging students, teachers, and support personnel in structured dialogues through focus groups and participatory research helps identify context-specific needs and practical solutions.
- **Cooperation with Companies:** Companies operating in the sustainable energy and technology sectors should be systematically involved in research to identify qualification gaps and co-design inclusive curricula.
- **Actionable Outputs:** Research should lead to the creation of inclusive study plans, formal accreditation frameworks, and the institutionalization of cooperation networks between VET providers, industry, and policymakers.

In the Basque Country, CoVE initiatives such as SECOVE—anchored by institutions like Politeknika Txorierri—offer a platform to coordinate and extend this research-based approach. By embedding research in continuous feedback loops between VET centers, public authorities, and industry, the region can build a dynamic and inclusive VET ecosystem responsive to emerging social and economic needs.

Improving the Role of National Observatories (T5.2 – National Observatory)

One of the key deliverables of the SECOVE project is the creation of a transnational Observatory on Inclusiveness and Attractiveness of VET, aimed at supporting evidence-based policymaking and monitoring inclusion in STEM-related VET. The development of national and regional observatories—including one potentially aligned with the Basque Country's VET ecosystem—is ongoing.

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The Observatory's mission, as outlined in the SECOVE project framework, is to:

- Monitor the implementation and impact of inclusion policies, particularly those aimed at increasing the participation of women and underrepresented groups in VET and STEM.
- Collect, analyse, and disseminate data from VET providers to generate policy-relevant insights on attractiveness and inclusiveness.
- Develop and share teaching and learning resources for VET professionals—including trainers, counsellors, and institutional leaders—that promote inclusive practices.

The Observatory will be built through the following coordinated activities:

- Research and definition of indicators for VET inclusiveness, with a particular focus on intersectional factors (e.g., gender, socio-economic status, migration background).
- Identification and assessment of good practices that effectively promote inclusion and engagement in sustainable energy education.
- Creation and curation of pedagogical tools, resources, and guidelines to support practitioners in adopting inclusive methodologies.
- Uploading and open dissemination of resources through the SECOVE online platform.

For the Basque Country, while a dedicated national or regional observatory has yet to be formally established, the framework and methodology proposed by the SECOVE project can guide future developments. Regional stakeholders, including policymakers and VET institutions, are encouraged to align their own monitoring and evaluation mechanisms with the Observatory's objectives.

As a **work in progress**, the observatory represents both an opportunity and a call to action: to institutionalize inclusive monitoring at the regional level and to ensure that local realities are reflected in European-level data and strategies. The eventual integration of Basque VET data and practices into the SECOVE Observatory will reinforce regional innovation capacity and contribute to a more equitable VET ecosystem across Europe.

3. ENHANCING STAKEHOLDER ENGAGEMENT AND PUBLIC AWARENESS

Strengthening Stakeholder Engagement in Policy Development (T5.3 – Stakeholder Workshops)

Engaging stakeholders in dialogue around inclusion and attractiveness in VET—particularly in the sustainable energy sector—is essential for developing meaningful, effective policies and practices. In the Basque Country, several workshops have been conducted under the SECOVE umbrella, bringing together educators, companies, experts, students, and institutional actors to explore these themes in depth.

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One notable example was the **“Microelectronics, Energy, Women, STEAM, VET, and Employability”** roundtable held in collaboration with GAIA. The event highlighted:

- The underrepresentation of women in leadership positions within technical industries.
- The role of technical backgrounds in improving women’s employability and advancement.
- The need to move beyond motivational rhetoric (“if you want, you can”) and instead provide concrete support and structural change.
- The importance of lifelong learning, supportive environments, and diverse working groups in creating sustainable, inclusive workplaces.

These insights echo broader workshop outcomes across the region, where discussions emphasized:

- The value of making VET more responsive to regional industry needs, particularly in sustainable sectors.
- The need to create participatory spaces for underrepresented learners to voice concerns and co-design solutions.
- The benefit of embedding gender equality and inclusion goals into school-industry collaboration frameworks.

Future stakeholder engagement strategies should:

- Institutionalize multi-actor platforms that include learners, educators, civil society, companies, and public administrations.
- Create thematic working groups focused on inclusion and green skills development.
- Encourage company participation not only in dual training but also in advisory roles to align training with evolving labor market needs.

Enhancing Awareness Campaigns for VET Inclusion (T5.4 – Awareness Campaigns)

The SECOVE awareness campaign efforts in the Basque Country have spanned multiple formats and target groups, aiming to increase the visibility and desirability of VET pathways, especially among girls and young women.

Key activities included:

- A multi-phase campaign focusing on women, STEAM, VET, and employability (Sept–Dec 2023), with social media outreach, a face-to-face workshop, and website articles. It reached over 1,730 followers on social media and 5,000+ website visitors, and engaged ~50 participants in an in-person event.



- A campaign on attractiveness and inclusiveness in sustainable energy VET (Feb–Sept 2023), involving focus groups and internal dissemination meetings to foster institutional change.
- The ongoing “Female Technological Campus” initiative (March–Sept 2024), which combines social media content, direct school visits, and personalized outreach to high school girls, with early results showing strong engagement from students and educators alike.
- The launch of the Observatory-focused campaign (Oct 2024–ongoing), using podcasts, videos, and cross-institutional synergies (e.g., Equality Plan, Train the Trainers) to promote good practices in inclusive VET.

Key success factors and best practices include:

- Use of visual, interactive, and storytelling-based content to engage students.
- Inclusion of female role models to enhance credibility and relatability.
- School visits and personalized outreach as highly effective in reaching young women.
- Collaboration with industry experts and institutions, which reinforced the legitimacy and reach of the campaign messages.

Challenges identified:

- Difficulty in directly engaging policymakers via social media.
- Time constraints in coordinating in-person activities and ensuring alignment with academic calendars.

Recommendations for future awareness efforts:

- Scale campaigns through co-branded initiatives with schools and local institutions.
- Develop campaigns that are integrated with regional policies on equality and innovation.
- Increase use of podcasts, videos, and school-based ambassadors to promote VET and sustainability as inclusive, future-ready options.
- Develop shared content libraries across VET centers to ensure message consistency and reduce effort duplication.

4. IMPROVING TRAINING PROGRAMS AND LEARNING OPPORTUNITIES

Scaling Up Inclusive Summer Academies (T5.5 – Summer Academy)

Inclusive summer academies have demonstrated high potential as catalysts for engagement in STEM and sustainable energy pathways, especially among

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underrepresented learners. The 2024 Technological Summer Camp held at **Politeknika Txorierri** offers a compelling example of best practice in this regard.

The camp targeted students aged 16–17, with a strong gender focus (16 of 20 participants were female), and delivered a 55-hour trilingual program (Euskera, Spanish, English) using experiential learning to introduce core STEM and sustainability topics. Activities included:

- Energy systems through robotics (LEGO EV3 – FLL Superpowered Challenge)
- Digital fabrication and electronics (3D printing + Neopixels + Microbit/Arduino)
- Artificial intelligence and machine learning (App Inventor)
- Virtual reality development (Unity)
- Smart city prototyping (Makeblock + mBlock)
- Generative AI for storytelling (ChatGPT, Stable Diffusion, etc.)
- Video editing and communication (KDENLIVE)

These activities enabled students to engage with current and future-oriented technologies, enhancing their technical confidence and promoting innovation, creativity, and critical thinking.

Strategies for Designing Tailored Learning Paths

The summer academy exemplified inclusive and engaging learning by:

- Offering accessible, low-barrier entry points to advanced technological tools, regardless of prior experience.
- Emphasizing project-based learning with real-world applications.
- Using trilingual delivery to support linguistic diversity and inclusion.
- Fostering team collaboration, peer learning, and iterative problem-solving.

These approaches suggest scalable strategies for broader implementation:

- Introduce modular, extracurricular STEM programs linked to VET pathways, especially at lower EQF levels.
- Use short-term, intensive formats (like summer schools or challenge weeks) to reach new learners.
- Create transition programs bridging lower secondary education with technical VET courses.

Insights from Participant Experiences

Post-program feedback demonstrated substantial impact:

- Significant increases in student interest in STEM fields, especially technology and engineering.

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- Greater confidence in succeeding in math and science, suggesting a shift in self-perception.
- Improved perceptions of gender equality in STEM opportunities.
- For most participants, it was their first experience in a STEM-related extracurricular activity, confirming the need for early exposure.

These insights underline the importance of designing activities that both inspire and empower underrepresented learners—particularly girls—to pursue technical education and careers.

Encouraging Gender Inclusion in Technical Fields

The summer academy prioritized gender inclusion through participant selection, mentoring, and content design. Key takeaways include:

- Role model visibility: Female instructors and mentors enhance relatability and aspiration.
- Creative, hands-on projects: Encourage confidence and reduce stereotypes about who belongs in STEM.
- Integrated discussions on equity: Reflection activities promoted awareness of gender issues in STEM.

Building on these lessons, recommendations include:

- Offering similar summer academies in VET centers region-wide.
- Partnering with equality bodies (e.g., Emakunde) to develop gender-sensitive STEM content.
- Recognizing and scaling VET initiatives that show strong gender inclusion outcomes.

5. IMPLEMENTATION AND FUTURE DIRECTIONS

Action Plan for Implementing Policy Recommendations

To translate these recommendations into lasting impact, the Basque Country must integrate inclusive and attractive VET strategies into existing regional frameworks—such as the Basque VET Plan 2025, the Green Energy Transition Agenda, and the Smart Specialisation Strategy (RIS3 Euskadi).

Pilot actions aligned with the SECOVE model should be promoted across VET centers, especially those engaged in dual training, green technologies, and digital innovation. VET providers can take the lead by embedding inclusion metrics into curriculum development, student support systems, and institutional partnerships.

National and regional observatories—particularly those linked to the evolving SECOVE Observatory platform—will play a crucial role in consolidating practices, indicators, and policy feedback mechanisms.

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Defining Responsibilities for Different Stakeholders

Effective implementation requires coordinated action across the quadruple helix:

- Public authorities (Basque Government, education departments): Ensure strategic alignment, provide regulatory support, and allocate targeted funding to support gender equality, accessibility, and innovation in VET.
- VET centers and education networks: Lead curriculum adaptation, develop and deliver inclusive pedagogies, and facilitate work-based learning pathways for underrepresented groups.
- Industry and companies: Offer mentoring, internships, and role model visibility while collaborating on skills forecasting and curriculum co-design in sustainable sectors.
- Civil society and youth organizations: Act as intermediaries between communities and institutions, amplify student voices, and provide outreach to underrepresented learners.

Monitoring Indicators and Feedback Loops

To ensure continuous improvement, the following monitoring and evaluation strategies are recommended:

- Establish a core set of inclusion KPIs (e.g., enrolment and completion rates by gender, socio-economic status, migration background).
- Engage students, staff, and employers in participatory feedback loops using qualitative tools such as focus groups, satisfaction surveys, and dialogue forums.
- Publish annual regional reports summarizing progress and challenges related to VET inclusiveness and attractiveness—linking local efforts to the SECOVE Observatory's pan-European data ecosystem.
- Align monitoring mechanisms with institutional development plans and equality strategies, ensuring a systemic and sustainable impact.

These measures will enable the region to respond dynamically to evolving labor market demands while upholding its commitment to social equity and sustainable innovation.

6. CONCLUSION AND CALL TO ACTION

The Importance of Systematic, Long-Term Commitment to Inclusive VET

As the Basque Country navigates the twin green and digital transitions, it must harness the full potential of its population. VET is a cornerstone of this strategy—but it must be inclusive, forward-looking, and adaptable to meet emerging challenges and opportunities.

The insights gathered through the SECOVE project—via research, workshops, awareness campaigns, and pilot activities—demonstrate that meaningful inclusion in

VET is not just a matter of policy rhetoric. It requires concrete, sustained action at all levels: from classroom practice to strategic planning.

Summary of Key Policy Directions

1. Strengthen data-driven inclusion strategies, through enhanced research and the development of regional observatories.
2. Empower diverse stakeholders, including students, educators, companies, and civil society, in the co-design of inclusive solutions.
3. Expand accessible and flexible learning opportunities, with particular attention to girls and young women in STEM and sustainable energy.
4. Scale effective awareness and outreach campaigns, especially those integrating school visits, visual storytelling, and female role models.

Next Steps for Scaling and Sustaining Impact

To build on the SECOVE momentum, the following steps are recommended:

- Pilot inclusive VET initiatives across sectors aligned with RIS3 priorities (energy, advanced manufacturing, circular economy).
- Institutionalize gender equality and accessibility metrics in VET quality frameworks.
- Deepen collaboration with local and European observatories to benchmark practices and foster cross-border learning.
- Secure long-term investment in educator training, inclusive curriculum development, and industry-school partnerships.

Adaptability According to Labor Market Needs

As sectors like sustainable energy evolve, so too must the VET system. Inclusion must not be treated as a static policy goal but as a strategic principle that enables agility, innovation, and resilience.

By embedding equity into the DNA of vocational excellence, the Basque Country can position itself as a leader—not only in sustainable skills but in shaping a just and inclusive green transition.



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WP5. MAKING SECOVE INCLUSIVE AND ENCOURAGING WOMEN IN TECHNICAL PROFESSIONS

D5.3. Policy Recommendations for Inclusive and Attractive VET in Sustainable Energy

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Abbreviations and Acronyms

STEM	Science, Technologies, Engineering and Mathematics
WP	Work Package
VET	Vocational and Educational Training

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1. Introduction

Accessibility, attractiveness and inclusiveness are three criteria yet to be answered by STEM education and industry. Despite evidence showing that women have the necessary components to successfully perform in the field, there is a relatively high gender disproportion in STEM education and industry, especially when focusing on fields related to sustainable industries, as the ones addressed in SECOVE. Research reveals a complex picture of intersectionality between social, cultural and institutional factors and individual motivations and values, that in turn, give rise to a lower attendance of young women in STEM.

While there are far more opportunities today than ever for young woman to pursue science, technology, engineering and mathematics fields, social, cultural and systemic factors constitute barriers **not yet successfully addressed** by academia, industry and the government, which later contribute heavily for the **disproportionate ratio** of gender in STEM. In Portugal, although inclusion and equality seem to be addressed as one of the priorities in the policy agenda, gender imbalances are still perceived in VET education in STEM. This indicator, along a lack of sex-disaggregated available data regarding VET education enrolment, completion and later job placement reveals that gender inclusion is still a reality to achieve in Portugal by the next decades.

The present policy recommendations aim to set a basis for **local, regional and European institutions and policy makers** to increase the **attractiveness** and **enhance** the inclusion of VET education to young women and diverse learners, particularly in those male-dominated sectors, while simultaneously encouraging excellence of VET system. The current recommendations are contextualized within SECOVE's **WP5 – Making SECOVE Inclusive and encouraging women in technical professions**, an integrated and holistic effort aimed at recognising and instigating the **value** of diverse educational and professional environments in generating **sustainable and innovative development**. It integrates an holistic and interdisciplinary approach to gender inclusion, identifying the **Quadruple-Helix Approach** as the ground working framework. As such, it highlights gender inclusion **recommendations, best practices and action points** to stakeholders in government, academia, industry and civil society, indicating that an effective approach is only possible within **an interdisciplinary, structural and collaborative format**.

The present document finishes with a proposition of an **action plan**, directed at guiding Q-Helix stakeholders for an enhanced, targeted and interdisciplinary approach towards increasing attractiveness and inclusion of VET education and professionalisation, particularly in STEM-related fields.



2. Strengthening Data Collection and Policy Monitoring

2.1. Enhancing research on inclusivity in VET (T5.1. – National Research)

The activity T5.1 **Enhancing research on inclusivity in VET** was structured with the objective of investigating the inclusiveness and attractiveness of VET in the participating countries and, more broadly, in Europe. The primary focus was on assessing how inclusive VET education in sustainable energy is, particularly for women, and identifying strategies to increase the inclusiveness and attractiveness of VET.

The methodology behind the Portugal National Research includes a combination of **desk research, surveys, and interviews/focus groups**, designed to gather both quantitative and qualitative data to provide a comprehensive analysis of the current state of Vocational Education and Training (VET) in sustainable energy in Portugal, with a particular focus on inclusivity and attractiveness for disadvantaged groups.

2.1.1 Key-findings from Portugal

Triangulation of results revealed a substantial array of data that can serve as an **inspiring groundwork** to propose actionable changes and far-awaited interventions regarding the promotion and enhancement of STEAM and renewable energies as pathways for young women.

- ◆ Portuguese's **underlying VET justification** is asserted in **civic conventions**, being mainly characterized by policy reforms and instruments that support inclusion of diverse learners. However, despite initiatives dedicated to support these groups, its success has been mixed, particularly for migrants and people from lower socioeconomic backgrounds who face additional challenges. Furthermore, due to the mainly civic function of VET in Portugal, its pathways are often not sought from more privileged groups due to its lack of association with **excellence and progression towards higher levels of education**.

Best Practices:

Offering financial incentives such as allowances, grants and scholarships for learners from disadvantaged background, as well as support for enterprises to train and employ diverse learners can substantially boost the participation of diverse learners in STEAM.

Including a competency-based approach to qualification supports the validation, recognition and certification of professional competences, despite the learning pathways taken to do it. The **Learning Outcomes Approach (LOA)** of the Portuguese National Qualification Framework (NQF) supports the inclusion of learners that took **untraditional paths to learning**, thus potentiating socio-professional integration of STEAM and other fields.



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- ◆ Women are **underrepresented** in STEM fields, particularly in engineering-related fields (27%) despite comprehending the most represented gender in higher educational system. They are further underrepresented in the VET Technological Specialization Courses (EQF Level 5), *although specific data does not exist to allow the analysis of the level of extent of misrepresentation of women in sustainable energy.*

The field research highlighted that **gender stereotypes, socio-cultural micro and macro contexts** and **contact experiences** with STEM may significantly influence interest and engagement of young women with science, technologies, engineering and math. The **lack of female representation** in STEM content and training materials was further addressed as barrier towards female representation in the fields.

Best-Practices:

Design initiatives aimed at motivating young women with STEAM fields. “**Engenheiras por um Dia**” comprehends an initiative with various Editions already, designed to motivate young women by introducing them early to technological professions and environments.

- ◆ Portugal has enacted **progressive legislation** to support gender equality in education, work and training since the 1973 law on equal access. Over the years, this legislation has addressed issues like labour discrimination, parental protection, the gender pay gap and underrepresentation of women in leadership roles.

Despite progression, however, there are still challenges in achieving full gender equality, particularly in high-level positions and male-dominated fields like STEM and engineering.

Best-Practices:

Introduction of laws to ensure *balanced gender representation in leadership positions* of public and private companies. This legal framework has led to an increase of the percentage of women on boards from 16,2% to 24,6% in 2019.

Provision of tax incentives to promote **pay equality** in public and private sectors.

Integration of gender equality into *collective labour agreements*, as complementary clauses that protect workers from harassment and gender discrimination, ensuring that gender equality is not only embedded legally, but culturally.



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Opening funding opportunities addressed at initiatives aimed at promoting gender equality and inclusion, including projects that evaluate the impact of inequalities and tools for improving equality.

- ◆ *Intersectionality* may play a substantial role in achieving educational, social and professional inclusion in STEAM fields, due to language barriers, unrecognized qualifications, bureaucratic procedures and limited access to professional networks. These obstacles hinder their ability to participate fully in the labour market and progress in careers.

2.1.2 Opportunities for Gender Inclusion in STEM Education and Professionalisation

The **main recommendations** expressed here take full advantage of insights emerged from both the desk and field research carried in Portugal.

- ◆ *Enhance female (and diverse) representation* in content and training materials, communication of STEAM courses, and beyond. **Female role models** are identified highly as primary and significant actors in motivating young women to pursue STEM Fields, and thus their involvement in learning activities and environments should be sought for both VET and regular education.
- ◆ Implement *gender-inclusion tracking mechanisms*, assuring availability of data **segregated by sex** in STEAM education and professionalisation. The monitoring of such data grants that implemented actions are rooted in evidence and follow current and localised needs.
- ◆ Establish *sustainable collaborations* between educational and business sectors, both nationally and internationally, to provide a close and immersive contact of young women with male-dominant fields.
- ◆ Educate **teachers, students, parents and general society** regarding gender roles and its influence on educational and professional choices and paths.
- ◆ Prepare **VET trainers in cVET** to adopt a **competency-based approach**, in which student-centred pedagogical methodologies are prioritized in order to support learning of (not only) diverse groups.
- ◆ Open *funding support* to educational and business initiatives addressed at enhancing gender inclusion and equality in STEM education and professionalisation.



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- ◆ Increase *financial support* like **scholarships, grants and awards** for students from vulnerable backgrounds, including career guidance, mentorship and support programs that enhance their motivation and capacities to pursue such path.
- ◆ Propose a common understanding for **clear and operational frameworks** in national qualification systems, among social partners and business. This methodology shall aim at facilitating alignment of qualifications with market labour needs as well as support the recognition *of diverse learning pathways of learners*.



3. Enhancing Stakeholder Engagement and Public Awareness

3.1. Strengthening Stakeholder Engagement in Policy Development (T5.3. Stakeholders Workshops)

In the promotion of inclusivity, **engaging stakeholders** emerges as a key-strategy. In SECOVE project, stakeholder workshops were developed aimed at building a critical shared understanding of challenges, opportunities and potential policy interventions that enhance the inclusiveness and effectiveness of VET in the renewable energy sector, while supporting collaborations and synergies between the different business, educational and policy sectors.

3.1.1 Portugal Stakeholder Workshops

The stakeholder workshop in Portugal had the opportunity to **engage 28 VET trainers, learners and job seekers** in a shared dialogue and discussion about pathways to improve gender inclusion of STEAM industry, particular in the renewable energy sector. With this objective in mind, the workshop followed a participatory format to engage participants and gather valuable insights regarding barriers faced by women and minorities in accessing VET in sustainable energy and emerging opportunities for inclusion.

Stakeholders Insights

Results of the stakeholder workshop in Portugal soundly reflect the available evidence and desk research developed by consortium partner's regarding gender inclusion in renewable energies. In particular, participants highlighted:

- ◆ *Generalized unawareness* of the array of opportunities within the renewable energy sector, with most participants expressing surprise at the variety of career and training opportunities in the field and with most revealing to never considering it as a potential career path.
- ◆ *Gender Disparity in Renewable Energy*, with most women expressing the perception that the industry is **male-dominated** and that they lacked visible female role models to even considering the field to be a reliable and relevant option.
- ◆ *Gender Roles as the main barriers* to women entering the renewable energy sector, with many emphasizing that societal expectations often deterred them from pursuing technical careers.
- ◆ *The need for a systemic and holistic approach to gender inclusion*, with participants calling for more inclusive policies and better integration of vulnerable groups (e.g., migrants, people with disabilities) into VET programs. While many participants agreed that increasing gender inclusivity in renewable energy is relevant, a portion still revealed **scepticalness** about the feasibility of changing **entrenched cultural and industry practices** regarding gender roles and beliefs.

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Key Recommendations

- ◆ Strengthen **awareness campaigns** focused on career opportunities in renewable energy, highlighting the increased demand for skilled workers in solar, wind and energy efficiency. Practices with such potential include:

Best Practices:

Highlight **successful STEM women testimonies** in renewable energy, aiming to shift attention towards sectors where gender representation is still to meet. Using these personal journeys in **diverse media outlets** was identified as a practice to ensure widespread dissemination and later engagement of more young women in male-dominated sectors.

- ◆ Organise **visibility events**, where young women can have the opportunity to directly interact with STEM women in the industry, while, simultaneously, observe the array of STEM professional path possibilities.
- ◆ Bring **industry stakeholders** into the gender inclusion discussion, as key-players in assuring entry (and progression) of women in STEM careers. The local workshop in Portugal reflected the difficulty in mobilizing industry stakeholders, as participants were only representative of the educational sector. Some suggested engagement practices can include:

Offer **practical collaboration opportunities**, such as work-based learning internships and traineeships for women.

Establish **incentive schemes** (such as financial rewards) **and accountability mechanisms** to actively involve businesses in achieving gender representation and inclusion goals. These goals could include targets like balanced male/female representation across job roles and the development and implementation of an inclusion and equality plan.

3.2. Enhancing Awareness Campaigns for VET Inclusion (T5.4. Awareness Campaigns)

Underrepresentation of young women in STEM fields, particularly those related to technology, engineering and mathematics comprehends a **multifaceted phenomenon** that includes broader structural and systemic barriers to women's inclusion and achievement of gender equality around the sector. **Gender roles, discrimination and lack of inclusion policies** undermine women's representativeness in STEM education and workforce, especially those concerning power and decision-making positions.

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Considering national and broader EU realities, **initiatives** and **policy actions** are needed beyond efforts towards increasing *attractivity* of women towards technical occupations. Wider concerns are needed to bring awareness and educate the public about the gender gap in STEM fields, as well as concrete and structural changes towards *inclusive education and labour policies* in integrating women in these sectors.

Communication plays a significant role in bridging awareness to gender inequality and generating reforms within STEM sectors' practices. Today's **social media channels** are continuously being sought for to *sensibilize, inform, educate and advocate* for wider changes. Indeed, a study from Chen and collaborators (2023) found that media plays a significant role in shaping students' interest in STEM careers. As such, and in pursuit of mobilizing educational, labour and policy actors that have the power to install gender inclusion practices and regulations, several **practices** should be considered in designing and implementing social media **awareness campaigns** addressed at gender inclusion.

3.1.2 Awareness Campaigns in Portugal

The awareness campaign in Portugal started to be organized in July 2024 and is planned to be finalized by December 2025. It took advantage of both Instagram and LinkedIn to achieve its objectives surrounding the enhancing awareness towards the genderisation of STEM careers, including the renewable energy sector, and the increasing of attractiveness of technical professions. At 12th of March, **#Sim, Ela Pode** Instagram account had 38 followers, 4098 views, 2457 reached accounts, 115 interactions and 134 profile visits. **#Mind_the_GAP** LinkedIn had 50 followers, 1475 impressions, 175 visits and 72 unique visitors. The main developed and yet to be produced content includes podcasts, street interviews, STEM workshops, awareness raising sessions and STEM competitions.

The awareness campaign in Portugal will remain operational for more 8 months, meaning that a final, integrated and holistic report is not yet available to scale-up findings into particular policy recommendations. Nevertheless, the diverse content that was already produced allows INOVA+ to **prematurely advance practices** that can be considered when designing and implementing awareness campaigns addressed at gender inclusion of STEM education careers:

- ◆ The definition of a clear and structured **Social Media Strategy** is essential. This includes identifying the awareness campaign's general and specific objectives; target audience; social media channels and features to be used; planned activities and content to be produced; foreseen online and physical events; content and posting strategy; and a content calendar.

Best Practices:

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Identify the social media channels and features content most widely used by the target-groups you are aiming to reach and use the channels accordingly. If your targets comprehend the youth community and students, **Instagram** and **Tik-Tok** may be channels to direct your effort towards. These channels are characterized by **high-engaging/low-demanding** cognitive features, and as such, the type of content to be produced must align accordingly. Small-duration videos and visually dynamic posts are identified as optimizing for these channels.

On the other way round, if you target individuals at an early-start of their careers, human resources representatives, education and training stakeholders, as well as enterprises, civil and social organisations and policymakers, you may want to include in your strategy LinkedIn as the social media platform to use. **LinkedIn** is widely used to promote events, job opportunities and share, mainly by **in-text**, challenges, opportunities and lessons related to educational and professional development. It serves as a facilitating channel to bridge connections between industry needs, job opportunities and the promotion of relevant skills in the current market.

Use complementary digital platforms for outreach, leveraging podcasts, webinars, blogs and interviews to engage with diverse audiences.

Study the social media channels' current trends, algorithm changes and keep an eye on ever pressing volatile changes. Engaging the communities you want to reach requires a close-attention towards the content that is being actively consumed and looked-for by the target-groups you want to reach. Otherwise, you will face challenges in organic reach and engagement with your posts, and respective difficulties in mobilizing change.

Maximise social media features for greater impact, taking advantage of “pins”, “collaborative posts and reels” and “now you” items to foster ongoing and interactive engagement with the target-audience. Add hashtags that relate to STEM, education and gender equality; mention users; comment and share relevant external posts; and whenever possible interact with target-groups via answering comments, asking questions, doing polls, etc.

Use stories to build-up the release and engagement of target-groups with the content. This may include “breaking up” content into several parts, maximizing efforts, while keeping users continuously engaged and eager to know more.

- ◆ The definition of an **Operationalization, Monitoring and Update** Plan is further intended as essential, as a preliminary identification of key resources and potential synergies and collaborations allows the anticipation of overgrowing needs and the



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definition of an action plan to cover them. The document must be monitored frequently and updated accordingly.

- ◆ The design of a **Quality Assessment and Impact Plan**, whereby key quality domains and principles and specific indicators and instruments are set in place, including a monitoring strategy.
- ◆ Acknowledge the **multi-faceted** nature of gender inequality in (not only) STEM education and workforce, developing content that brings visibility to structural and systemic factors as well as to underrepresented groups.

Best Practices:

Promote gender-neutral and inclusive language in all content. Language is a powerful tool for shaping perceptions. Gender-neutral language helps avoid reinforcing stereotypes and fosters an environment of inclusivity from the outset. Developing an awareness campaign for gender inclusion that is not coherent with the inherent used language will not bring advocates for the cause.

Highlight how different factors further contribute to inequalities in education and labor, other than gender, and how they interact between each other. Recognising intersectionality is urgent, as STEM fields have historically been dominated by certain demographics. Broadening the focus on gender to include intersectionality helps create more comprehensive narratives that reflect the true diversity of STEM experiences and opens space to advocate for policies that acknowledge the interplay of factors in exclusion.

- ◆ Address **gender misconceptions** surrounding STEM education and professional careers, challenging traditional gender norms.

Best Practices:

Leverage real testimonies and data evidence to highlight that the sectors are not gender-based and that women are equally competent and interested in pursuing such fields. Showcasing female role-models in male-dominated sectors can be a great pathway to encourage young women in considering non-traditional educational choices.

- ◆ **Engage leaders of tomorrow** in the discussion surrounding gender roles and gender inclusion in STEM fields, particularly in an era where women are more progressive and men are leaning towards conservative attitudes.

Best Practices:

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Bringing men to the discussion, by enhancing the role they play in driving individual, social and broader systemic changes. Men occupy most of the power and leadership positions, making them key actors in fostering gender inclusion policies.

Broadening gender inclusion as a collective responsibility, by opening-up public discussion pathways and opportunities for youth to express own opinions, concerns and recommendations regarding gender exclusion. Developing spaces within the social media platforms (e.g., **opinion columns**) solely dedicated to the expression of supporter's insights – and where everyone *interested in the cause can join* - fosters an open dialogue and conversation around gender inclusion in STEM.

Organize cultural competitions focused on gender inclusion, inviting the community to submit **art-based works** that depict inequality in STEM fields. For example, **photography** and **videos** are powerful visual tools that can convey emotions and insights in ways that words sometimes cannot.

Engage youth in roll-out workshops aimed at encouraging their reflection around gender roles in professional options and bring awareness towards how social norms influence educational and professional pursuits.

- ◆ Involve **key members of the target-groups** when communicating the campaign's messages. Women role models can be used as a bridge to inspire young women in pursuing STEM fields, by sharing their professional work and self-experience as a woman in STEM. This can create reliability and inspiration for the target audience.

Best Practices:

Involving women who are in decision-making and leadership positions is key to communicate that is possible, while highlighting the difficulties that come with it. Internalised gender roles, increased pressure from higher positions to succeed and self-suppression to not originate hazards in the workplace are some experiences women in (not only) leadership positions face, simply, because they are women.

Use trusted community figures and stakeholders to deliver the campaign's message, ensuring the reach an enhancing impact to the target group audience.

- ◆ Facilitate **collaborative discussions** between educators and trainers, industry representatives, STEM women, policy makers and social and civil organisations, enabling the lobbying of policy structural and systemic changes.

Best Practices:

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Facilitate cross-sharing of ideas between gender inclusion experts, industry leaders, and education institutes to explore how excellency and inclusion can co-exist and be complementary in the STEM field.

- ◆ **Establish partnerships and synergies** that build-up from or/and are complementary to the activities of the campaign, in order to leverage potential impact and further enhance possibilities of gender representation and inclusion in STEM.

Best Practices:

Share STEM or/and gender inclusion initiatives of external entities, facilitating the connection of young women with role models in STEM and low-cost opportunities for capacity-building.

Share testimonies and experiences of actors/participants/representatives in implementing national initiatives addressed at gender inclusion in STEM, opening-up pathways for stakeholders to replicate and scale-up the used methodologies. It is important to explore the **context, the methodology and the impact** of such initiatives, to guide external stakeholders into action.

- ◆ Develop opportunities for young women's participation related with **STEM experiences**, to actively enhance future possibilities to pursue fields under technology, science, engineering and math.

Best Practices:

Organise free workshops/small training programs, directed at increasing young woman's attraction to the STEM field, while supporting their development of STEM competencies (e.g., programming).

Organize STEM competitions targeted at young women and provide support to the awarded projects through incubation, accelerators or material vouchers to help scale their impact.

Connect young women with STEM role models, through online or/and face-to-face interfaces, where students can have their questions answered regarding STEM fields.



4. Improving Training Programs and Learning Opportunities

4.1. Scaling Up Inclusive Summer Academies (T5.5. Summer Academy)

4.1.1 Overview of the Portuguese Summer Academy

The Portuguese Summer Academy was designed to foster inclusivity in STEAM (Science, Technology, Engineering, and Mathematics) education, with a specific focus on sustainability. This academy served as an immersive and hands-on learning initiative aimed at engaging underrepresented groups, especially women, in STEM disciplines. The academy was designed to equip participants with practical skills and knowledge of sustainability while offering a platform for collaboration with peers to develop innovative solutions for pressing global challenges, such as climate change and resource management. The long-term objective was to provide an experience that fosters confidence and nurtures a sustained interest in pursuing technical fields. A total of 24 participants took part in the Portuguese Summer Academy.

Methodology Used

The Portuguese Summer Academy employed an experiential learning methodology, with a strong focus on **Project-Based Learning (PBL)** – a methodology **well-centred** in the groundwork of SECOVE project. This approach allowed participants to engage with real-world challenges, encouraging collaborative problem-solving and creative thinking across the different areas involved in STEM, while supporting theoretical knowledge.

Portugal Summer Academy Program

The program spanned two weeks, with a structured and well-defined plan to provide, at a first moment, **key knowledge, concepts and facts** surrounding sustainability and STEM in the first week, and in a second opportunity to foster **technical and practical competences** surrounding the themes.

1. Week 1 - Introduction to STEAM and Sustainability

- ◆ *Day 1:* Introduction to the program and the challenges faced by higher education institutions in Europe, with a focus on inclusion, gender equality and sustainability.
- ◆ *Day 2-5:* Intersection of STEAM and sustainability, with sessions covering topics related to energy systems, environmental challenges and the role of engineering, science, and art in addressing sustainability issues.

2. Week 2 - Project Development and PBL Methodology

- ◆ *Day 6-9:* Design and communication of solutions and prototypes in collaborative groups, using the PBL methodology.

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- ◆ *Day 10:* Reflection about the future of STEAM and sustainability in higher education, with an emphasis of opportunities for women.

Insights from Participant Experiences and Recommendations for Future Programs

Initiatives aimed at connecting young women with STEAM sectors is found in research as a potential facilitator of motivation and future interest in following the industry (Sáinz et al., 2022). In Portugal, the SECOVE summer academy has revealed to produce positive outcomes related to the level of **confidence** (55%) and **young women's interest** (86%) in pursuing STEM fields, particularly in science (73%), technologies (77%) and engineering (82%). While the level of interest was already expected from participants, as these were already women enrolled in engineering-related higher education degrees, the level of confidence reveals interesting insights, as almost half did not reveal to feel confident to succeed in their field. Additionally, although the number of participants did not allow a reliable statistical analysis, it was found that the higher the confidence of participants in succeeding, the lower the likelihood of perceived gender barriers in STEAM. As such, various **practices** can be recommended to be applied when thinking about developing initiatives aimed at engaging and motivating women to pursue and progress in STEAM:

- ◆ Approach how **internalized gender roles** can influence own's attitudes and interests towards STEAM, **own identity and self-efficacy**. These can be integrated in similar initiatives as the one of SECOVE Summer Academy. Promoting women's awareness for social and cultural aspects of gender inclusion can empower women to feel more capable and resilient when encountering obstacles, as they no longer may feel the "actors to blame" or to "diminish themselves".
- ◆ Connect students with **women role models** that have successfully navigated through gender barriers in STEAM. Opening up opportunities for students to discuss and share concerns and difficulties alongside someone that looks like them and has overcome them, can be powerful in building young women's confidence.
- ◆ Include empowering sessions on the **added value women** play in STEAM and how diverse educative and professional environments have been found to produce creative and reliable solutions. Some activities can include:

Supporting cross-gender collaboration projects and group activities that can demonstrate the power of diverse teams.

Organise and mobilize young women into *leadership workshops*, supporting the development of key competences valued in the labour market, while reinforcing women's voice and position in science and society.



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Connect young women with industry players, facilitating conditions and opportunities for students to think, design and communicate solutions for real-world STEAM challenges. Part of these conditions include making sure **appropriate attitudes and training of industry partners** aligned with gender inclusion and diverse environments' principles.

Additionally, the SECOVE Portuguese Summer Academy further highlighted an interesting finding: to 86% of participating women, the summer academy was the **first STEM initiative they have participated** in, thus indicating the potentiality of some taken **actions** for engaging young women in future similar activities:

Best Practices:

Targeted approach for women may have supported the student's perception of a women-centred environment, thus encouraging their participation in the initiative

Intersectionality of STEAM disciplines in sustainability was at the centre peak of the Portuguese summer academy. This highlighted the interconnectedness of various STEAM disciplines in addressing sustainability challenges, which may have encouraged young women in participating to have a **more holistic understanding** of how diverse fields contribute to the design of innovative solutions to address environmental phenomena.

The longer and immersive learning experience of the SECOVE summer academy (2-week duration) may have contributed to engage young women, in comparison to other shorter duration sessions. The provision of a **participance certification** could have also contributed for young women's participation.

Provision of practical and hands-on learning methodologies was also a centred characteristic of the initiative's leaflet, which may have contributed to the participant's interest.



5. Implementation and Future Directions

Building upon the findings and recommendations derived from field and desk research, stakeholder engagement workshops and social media campaigns, as well as the summer academy in Portugal, a convergent set of **policy recommendations** for promoting (not only) gender inclusion in STEM arises:

5.1. Policy Recommendations

5.1.1 Strengthen Awareness Campaigns for Renewable Energy and STEM Careers

- ◆ *Develop and implement national and regional social media strategies* aimed at increasing the **visibility of career opportunities** in renewable energy and STEM among women and minorities.
- ◆ *Highlight female role models* systematically in campaigns by leveraging personal **success stories** and active industry participation.
- ◆ *Use platform-specific content*, such as **Instagram/TikTok** for short videos showing women in action in STEAM careers; and **LinkedIn** for showcasing professional case studies, testimonies and sharing professional opportunities.
- ◆ *Complement social media posts with an interacting online and F2F approach*, aiming to not only create awareness regarding gender roles and its influence in educational and professional choices, but also to more proactively **engage and motivate** young women in pursuing STEM fields.
- ◆ *Engage men as allies*, developing campaigns that specifically encourage **male leaders**, students and trainers to actively promote inclusion.

5.1.2 Enhance Gender-Inclusive Training Content and Pedagogies

- ◆ *Mandate a gender-sensitive curriculum review* to ensure female representation in case studies, images, examples and **historical references**.
- ◆ *Prepare and train VET Trainers* on **student-centred** and **competency-based approaches** that actively challenge traditional methodologies and promote the recognition of diversity.

5.1.3 Develop and Implement Incentive and Accountability Mechanisms for Business

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- ◆ *Tie public funding eligibility to diversity efforts, assuring that only businesses with approved gender inclusion and equality mechanisms can access to **publicly funded benefits**.*
- ◆ *Offer tax breaks or grants to businesses that meet measurable **inclusion and equality milestones** (e.g., increased female representation in technical roles by 10% over 2 years).*

5.1.4 Create Public-Private Programs for Female Talent Development

- ◆ *Develop structured internship and apprenticeship programs* specifically targeting women and underrepresented groups in renewable energy and related STEM sectors.
- ◆ *Establish mentoring programs*, pairing industry professionals (especially women) with VET students or recent graduates.

5.1.5 Embedded Monitoring, Tracking and Evidence-based Policy Adjustment Mechanisms

- ◆ *Require the collection and reporting of sex-disaggregated data* at all VET institutions, focusing on **enrolment, completion and job placement** in STEM and renewable energy fields.
- ◆ *Integrate data requirements into project and funding conditions*, requiring that any educational initiative receiving public funding assures **gender representation and inclusion principles**.

5.1.6 Promote Systemic and Structural Changes in VET and Labour Markets

- ◆ *Integrate intersectionality into all inclusion measures*, developing programs that simultaneously address multiple barriers.
- ◆ *Embedded diversity principles into VET accreditation frameworks*, making diversity a formal criterion in the recognition and quality assurance of qualifications.
- ◆ *Use National Observatories* to regularly monitor inclusion trends and publish public reports on gender equality in STEM education and careers.

5.1.7 Empower Young Women in STEM and Renewable Energy

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- ◆ *Build confidence and self-efficacy of young women*, by integrating sessions addressing how internalised gender roles influence **self-perception, gender biases and career aspirations**.
- ◆ *Establish structured mentorship programs* where young women are paired with experienced women in STEM and renewable energy fields.
- ◆ *Facilitate industry immersion experiences*, including internships, company visits, job shadowing and project-based collaborations.
- ◆ *Launch co-branded initiatives* where businesses and VET providers collaborate in proportioning **real-world technical projects** for young female students.

The abovementioned recommendations reflect the **holistic and interdisciplinary** nature of gender inclusion, highlighting the roles of more **micro and macro systems** in shaping the social culture around gender, and “*chosen*” educational and professional paths. A coordinated approach is, thus, required, being urgent the mobilization and participation of **Quadruple-Helix** Stakeholders, them being representative of **government, academia, business and social and civil society**. An **action plan towards gender inclusion** is, thus, suggested, in accordance, below:

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5.2. Action Plan for Gender Inclusion within a Q-Helix Approach

Table 1. Action Plan for Gender Inclusion within a Q-Helix Approach

Objective	Activity	Q-Helix Stakeholder	Timeline*	Needed Resources
<i>Increase visibility of renewable energy and STEM careers among women and minorities</i>	Launch national and regional social media campaigns with female role models, while simultaneously engaging male allies	Government, Civil Society and Academia	Short-Term	Communication experts, campaign budget, platform partnerships
<i>Ensure gender representation in education materials</i>	Conduct mandatory gender-sensitive curriculum review and update content	Government and Academia	Long-Term	Pedagogical experts, curriculum review panels
<i>Train educators on inclusive pedagogies</i>	Implement CB programs for VET trainers on student-centred and competency-based approaches and methodologies, in ITE and CPD.	Academia	Medium-Term	Training modules, expert trainers
<i>Incentivize businesses to promote inclusion</i>	Tie access to public funding, tax incentives and awards to the existence of Gender Equality and Inclusion Plans and other inclusion and equality mechanisms of organisations in the industry sector	Government	Long-Term	Legal frameworks, assessment criteria
<i>Expand opportunities for young women in STEM careers</i>	Establish structured internships, apprenticeships and mentoring programs	Industry, Academia and Civil Society	Short-Term	Partnership agreements, mentorship frameworks
<i>Improve monitoring and reporting on inclusion</i>	Require systematic collection and reporting of sex-disaggregated data in education and funded projects	Government and Academia	Medium-Term	Data collection systems, training for reporting
<i>Promote systemic change in VET accreditation frameworks</i>	Integrate diversity principles into VET accreditation standards	Government and Academia	Long-Term	Legislative support

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<i>Empower young women to pursue STEM</i>	Organize confidence-building, leadership and industry immersion programs	Civil Society, Academia and Industry	Short-Term	Workshop content, industry partnerships, mentorship networks
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6. Conclusion and Call to Action

The activities carried out under **WP5 – Making SECOVE Inclusive and encouraging women in technical professions** show the persistent gender disparities within STEM education, particularly in VET, and the renewable energy sector. Despite significant advances in gender equality across various sectors, young women remain underrepresented in these critical fields. The root causes of this disparity are multifaceted, ranging from societal gender roles and stereotypes to institutional barriers and a lack of sufficient support systems for women in technical professions. These systemic challenges have a profound impact on young women's educational and professional choices, leading to under participation in STEM and renewable energy sectors.

The SECOVE project provides a foundation for change, with the present policy recommendations designed to address these barriers and create a more inclusive and attractive environment for young women in STEM technical fields. By integrating *gender-inclusive and gender empowering initiatives, ensuring the visibility of female role models, enhancing stakeholder collaboration, fostering industry-academic partnerships and monitoring gender-segregated data*, we can encourage greater participation and retention of women in STEM and renewable energy careers. Furthermore, the inclusion of intersectionality in all measures, ensuring that the needs of disadvantaged groups are addressed, is critical to creating a truly inclusive STEM environment.

To achieve these goals, the set recommendations focus on immediate actions, such as strengthening awareness campaigns and creating structured pathways for mentorship and professional development of young women. However, the path to systemic change requires coordinated efforts across all levels—*policy, education, business and civil society*. These efforts must be guided by an evidence-based, interdisciplinary approach that fosters a lasting, inclusive culture in both education and the workplace.

6.1. Call to Action

Throughout the SECOVE project, a variety of activities have been conducted to evaluate the current state of inclusivity and promote excellence in VET, particularly in the context of renewable energy field. These activities have been strategically designed to address the multifaceted barriers that hinder the participation of women and minorities in these sectors, providing a comprehensive framework for action.

Based on the insights gained from these initiatives, tailored actions have been developed to target key dimensions of the issue. These actions are designed to align with the specific responsibilities and capabilities of each stakeholder group, ensuring that all levels of society—policy, education, industry and community—are mobilized to foster a more inclusive and equitable environment for women and minorities in VET education of technical fields. By

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engaging each actor in a way that leverages their strengths, SECOVE seeks to create a collective impact that drives sustainable change across the sector.

The following diagram (Figure 1.) provides a visual representation of the **role** each Q-Helix stakeholder plays in achieving a gender inclusive environment and culture surrounding technical fields, including renewable energy sector.



Figure 1. Key-actors of gender inclusion in STEM Education and Labor and specific roles (inner circles represent the actors and the outer ones their respective roles).

Governments and policymakers surrounding education, labor and social fields play a critical role in setting the legal and policy frameworks that enable gender equity in education and industry. These policies will set the tone for actions by other stakeholders and *ensure systemic change*. Educational institutions and training providers, in instance, especially within an inclusive policy framework, hold a unique opportunity to shape the future workforce. By ensuring that VET curricula and teaching methods are inclusive and supportive, they can inspire and equip more women and minorities to enter STEM and renewable energy sectors. Additionally, in joint efforts with the industry representatives, opportunities for mentorship, initiatives and internships for motivating and engaging young women into technical fields can arisen from educational institutions and VET providers. Within these opportunities, connecting young women with *female role models* emerges as a potential predictor for increased interest in pursuing technical STEM fields. Industry, as such, can play a pivotal role in creating inclusive and supportive work environments, contributing to a future diverse talent pool. Finally, civil society and social

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organisations emerge as key enablers of inclusion and equity in STEM education and labor. They emerge as critical actors in shaping public perception and rallying community support.

6.2. Next Steps for Scaling and Sustaining Impact

6.1.1 Data Collection and Monitoring for Evidence-Based Policy

Effective inclusion strategies in STEM and renewable energy *require robust gender-disaggregated data* across **academia, VET and industry**. Yet, as highlighted by the workshops and analysis, current data is fragmented and underreported. Instead, it is approached within the Engineering aspect of STEM in Portugal. Strategic actions for scaling practices related to data monitoring include:

- ◆ Make gender-disaggregated data collection a **priority** across all education and employment pathways linked to STEM and renewable energy (e.g., enrollment, completion, hiring, ...).
- ◆ Include data reporting requirements as a condition for public funding in education and business.
- ◆ Develop *national frameworks*, led by the Ministry of Education and the Ministry of Labor, Solidarity and Social Security to systematically track participation and inclusion of women in **renewable energy**, whose findings are aimed at feeding impact of programs and initiatives. Although Portugal has **initiatives** (e.g., National Gender Equality Strategy 2018-2030) directed at improving data collection regarding inclusion status of education and labor systems, these are sector specific.
- ◆ Introduce incentives (financial or reputational) to encourage institutions and companies to transparently report data.

6.1.2 Enhancing Stakeholder Engagement and Public Awareness

Raising awareness about gender roles is essential to **shift perceptions** and **inspire participation** of young women in STEM. Engaging *women role models* in the process emerges as a key-potential predictor of young girls' interest and intention in enrolling into STEM education and labor market. At the same time, industry stakeholders as allies in the process towards gender inclusion of STEM and renewable energy emerge as key-fundamental action. In particular, specific actions can be taken towards the scalability and impact of the workshops and awareness campaign taken along Portugal:

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- ◆ Scale national campaigns that amplify stories of women in STEM featuring VET alumnae, engineers, technicians and entrepreneurs in renewable energy.
- ◆ *Institutionalize* participation of women role models in career events, school visits, STEM academies and gender inclusion awareness campaigns.
- ◆ Mobilize **male allies** in communication, engagement and awareness actions, as key-players in mobilizing more structured and systemic change.
- ◆ Provide incentive mechanisms for industry players to collaboratively open pathways for **work-based learning placements** specifically for women in renewable energy and for hosting /participating STEM-immersion initiatives that target young female students.

Educational institutes are critical in setting up these collaborations. The introduction of the LOA has not only promoted a **competency-based framework** of qualifications in Portugal for VET providers and trainers but has also provided to these players autonomy to design curriculum and methodologies accordingly so. *This autonomy has helped to redefine the role of VET institutions, positioning them not only as providers of education but also as key actors responsible for students' post-education outcomes, including successful transition into the labor market.* As such:

- ◆ Propose a common understanding for **clear and operational frameworks** in **national qualification systems**, among social partners, education and business. This methodology shall aim at facilitating alignment of qualifications with **market labor needs**.

6.1.3 Improving Training Programs and Learning Opportunities

The Portuguese summer academy showcases that *longer, immersive, interdisciplinary and experimental* training opportunities, solely targeted at young women, are essential to motivate young women's **interest** in pursuing STEM careers. Nevertheless, specific actions emerge as potential scalability predictors for enhancing the representation of young women in technical fields:

- ◆ Expand such focused STEM-initiatives into annual programs, with longer durations and a mix of STEM challenges and industry visits. Such approach allows an immersion experience of young women with work-based challenges frequently found in STEM careers, thus enhancing pathways for their future interest in pursuing science, technological, engineer or math professions.



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- ◆ Integrate *gender empowerment sessions* and activities within these initiatives' framework and plan. The findings in Portugal suggest that confidence levels in STEM may be related with gender inclusion perception of the sector, highlighting that young women who are *more aware of gender disparities* might need additional empowerment support regarding succeeding in STEM. In this context, **connecting participants with successful female role models** can play a critical role in inspiring and empowering them to pursue and thrive in STEM careers.
- ◆ Ensure that STEM-focused initiatives targeting young women are **introduced early**, particularly at *EQF levels 3 and 4*. Early exposure to technical fields helps challenge stereotypes and reinforces the message that **STEM is accessible to everyone**— as long as they have the opportunities to pursue so.

6.3. Conclusion

In conclusion, the activities conducted under WP5 of the SECOVE project underscore the significant challenges that remain in achieving gender inclusion in Portugal. While notable best practices and policy initiatives have been introduced to address gender disparities in education and labor, these efforts have not yet fully bridged the gap, especially in STEM fields and more nuancedly in renewable energy sector. **Concrete, interdisciplinary and early-stage actions** are essential to advance gender inclusion and attractiveness of STEM. Adopting a *Q-Helix approach*, we are confident that **inclusion and excellence** in STEM can be realized within VET education. The recommendations presented here are aligned with this framework, having the ultimate objective around the contribution towards the development of a **sustainable and diverse workforce** for the future in renewable energy sector.



7. References

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