



Blueprint

Impeding and facilitating factors for girls selecting studies in clean energy sector

(WP2 - D2.1)

“You don't need to adapt to the system—help change it!”



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1. Executive Summary

This Blueprint has been developed within the framework of the **STAR Girls project**, co-funded by the European Union, which aims to address the persistent underrepresentation of girls and young women in vocational education and training (VET) pathways related to STEM and the clean energy sector. STAR Girls seeks to identify and challenge the structural, cultural, and institutional factors that influence educational choices, with a particular focus on gender inequalities and intersectional barriers.

By combining comparative research, stakeholder engagement, and a gender-transformative approach, the project supports the development of evidence-based strategies to make clean-energy-related education and training more accessible, inclusive, and responsive to the diversity of girls' experiences across Europe.

This Blueprint consolidates and compares the evidence collected in the STAR Girls national reports (Spain/Basque Country, Greece, Portugal, Italy, and the Netherlands/Friesland case studies). It identifies the main impeding and facilitating factors that influence girls' decisions to pursue vocational education and training (VET) and other study pathways related to the clean and renewable energy sector.

Considering what has emerged from territorial analyses, and from a more structured understanding of the phenomenon also with a European perspective, **this document provides possible avenues of work to respond in a precise and systemic way to address the gender gap in STEM in general, and in the clean and renewable energy sector in particular. It reports and translates findings into actionable recommendations for education providers, policymakers, employers and EU institutions.**

In addition to its external relevance, this Blueprint has a clear internal value for the STAR Girls consortium. By consolidating evidence and comparative insights, it supports a common understanding of key challenges and leverage points, and directly informs the development of subsequent project activities, including mentoring pathways, pilot interventions, capacity-building actions, and strategic communication and policy outreach at national and European level.

Across all contexts, the evidence points to a persistent gendered division of labour and knowledge. Girls' interests and aspirations are shaped early by stereotypes about what is "for boys" and what is "for girls", while education and labour-market institutions can reproduce these expectations through curricula, guidance practices, workplace cultures and "neutral" policies that overlook structural inequality. As a result, girls are often less likely to enter technical VET pathways linked to electricity, electronics, mechanics, energy systems, digital technologies and industrial processes - despite being fully capable and often highly motivated when supportive conditions exist.

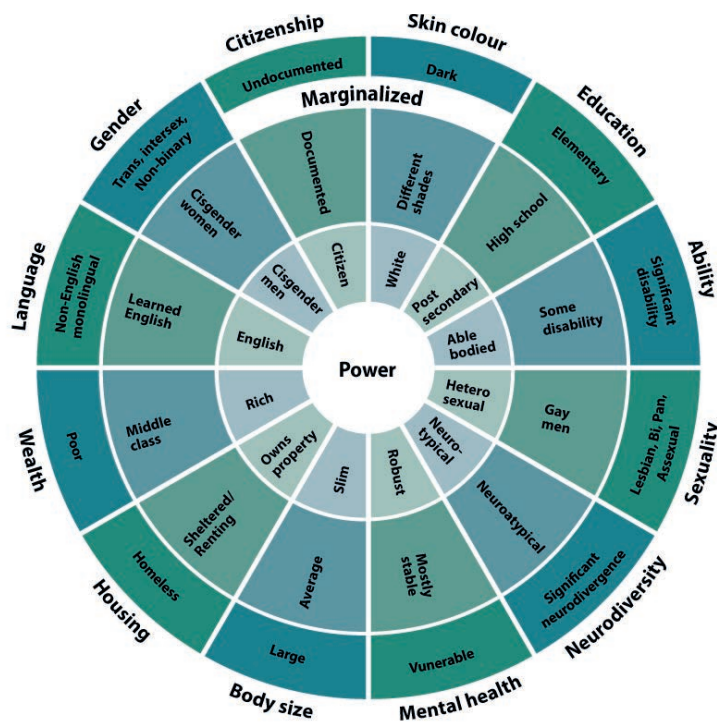
This Blueprint adopts a **gender-transformative, intersectional and feminist approach**. Rather than treating girls as the "problem to be fixed", it focuses on the **systems that exclude and the conditions that can enable girls** - in their diversity - to access, remain and thrive in clean and renewable energy-related studies and careers. In line with the STAR Girls research, in this document, **"inclusion" is treated as a starting point** rather than a point of arrival: the aim is not only to open doors, but also to question and transform the thresholds, norms and power relations that define who is considered to belong. Depending on the context, the language of openness, pluralism and the valorisation of differences can better capture this goal, because it explicitly challenges the systems that produce exclusion.

The recommendations provided promote **coordinated action across European, national, institutional and workplace levels** to address structural gender inequalities in clean energy education and employment. Grounded in an **intersectional and feminist approach**¹, they emphasise system change rather than individual adaptation.

¹ **Intersectionality** is a term used to talk about interrelated identities that make each person unique. Dr. Kimberlé Crenshaw, a Black legal scholar, came up with this term and approach. It explains how power and privilege impact the way each person experiences the world, based on their 'intersecting' identities. This means, an individual is likely to experience the impacts of racism more heavily if they belong to groups that generally experience less systemic power and privilege. In society, there are systems in place that support people who are part of the dominant culture. This reinforces their power and privilege over others.

People with less power and privilege face more barriers within various systems, such as school and medical systems. This is because systems have historically originated from values that protect the dominant culture (for example, colonial, patriarchal, heterosexual, and/or hierarchical values).

The wheel of privilege here below illustrates how multiple social dimensions - such as gender, socio-economic background, ethnicity, ability, age, and nationality - interact to shape unequal access to opportunities, resources, and recognition. In STEM, VET, and clean energy pathways, individuals positioned closer to dominant norms benefit from invisible structural advantages, while those positioned further from the centre face cumulative and intersecting barriers. The model highlights why gender inequality cannot be addressed in isolation and underscores the need for intersectional, gender-transformative approaches in education, training, and employment.



Guiding principles across all levels include:

- adopting **gender-transformative approaches** that reshape norms, cultures and power relations;
- making **intersectionality operational**, with targeted support for girls facing multiple barriers;
- advancing **critical inclusivity**, by redefining belonging and competence rather than reproducing gatekeeping;
- ensuring **co-creation and participation** of girls, educators and women professionals;
- avoiding **tokenism** through sustained ecosystems instead of one-off actions;
- embedding **accountability, monitoring and learning** through measurable objectives and evidence-based adjustment.

At **European level**, the focus is on framework-setting and coherence. Key priorities include embedding gender equality in EU green skills strategies and funding, mainstreaming gender objectives in energy transition policies (including NECPs), extending Gender Equality Plans to VET and skills initiatives, strengthening harmonised and intersectional data systems, and supporting cross-country learning through communities of practice. At **national and regional level**, policymakers are encouraged to align education, equality and labour-market policies. This includes integrating gender targets into VET governance and quality assurance, investing in early and sustained career guidance with family engagement, ensuring equitable access through financial and ma-

terial support, regulating and incentivising inclusive apprenticeships, funding long-term regional ecosystems rather than fragmented projects, and leveraging public procurement and investment to drive inclusion.

At the level of **VET providers, schools and guidance services**, recommendations stress institutional change in daily practice. Priorities include embedding gender-transformative pedagogy through continuous staff training, creating structured mentoring and peer-support constellations, redesigning communication and recruitment to eliminate stereotypes, strengthening bias-aware guidance and family engagement, ensuring safe and inclusive learning environments, and systematically monitoring participation, retention and transitions.

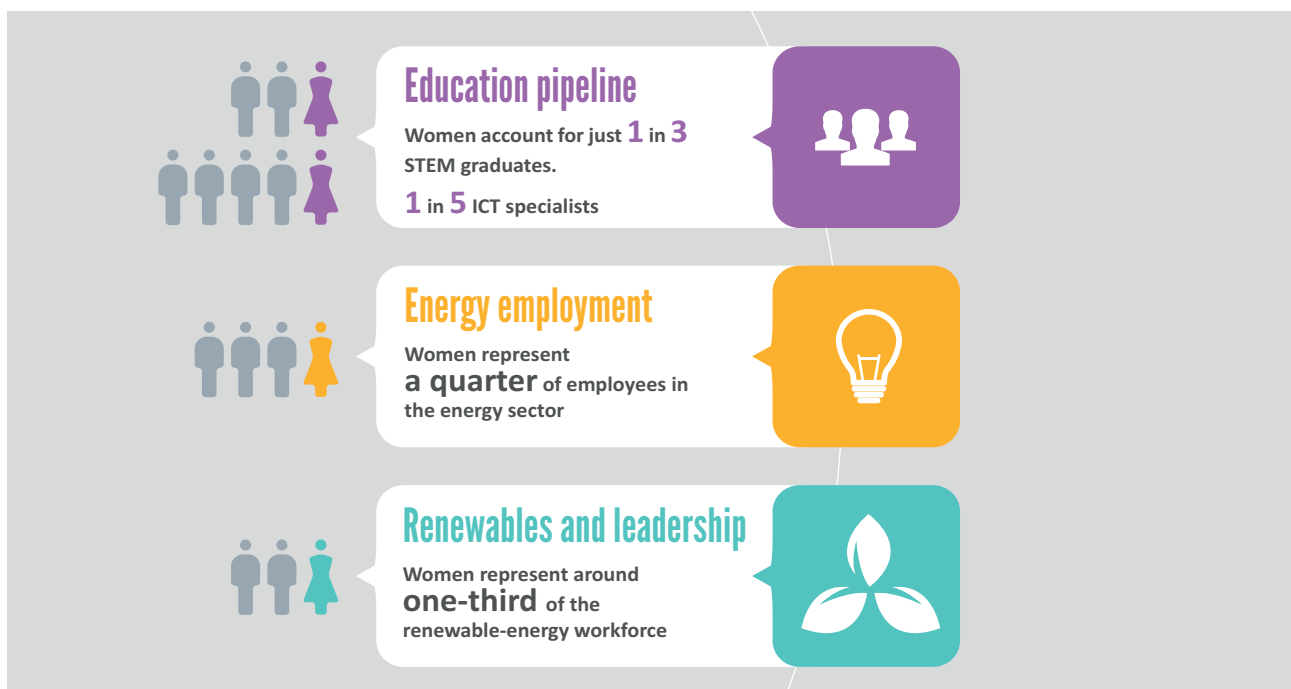
For **companies, employers and social partners**, the recommendations emphasise moving from symbolic commitment to structural action. Employers are called to set and resource measurable inclusion goals, guarantee safe and inclusive placements, eliminate task segregation and ensure fair career progression, support work–life balance for all workers, actively collaborate with VET providers and communities, and apply behavioural insights to reduce bias in recruitment and communication.

Overall, the recommendations underline that **gender equality in clean energy pathways requires sustained, multi-level and coordinated action**. Embedding equality into governance, funding, pedagogy and workplace culture is essential to ensure that the green transition is both socially just and economically effective.

1.1 Key European context

The clean energy transition is accelerating the demand for technical and green skills across Europe. However, women remain underrepresented both in the STEM education pipeline and in energy-related employment. **European-level indicators confirm that gender gaps are structural and persist across the education-to-employment pathway.**

- **Education pipeline:** Women account for just 1 in 3 STEM graduates (Eurostat, 2022) and 1 in 5 ICT specialists (Digital Decade Progress Report, 2024).” (European Commission – European Education Area, page last updated 20 June 2025).
- **Energy employment:** Women remain a minority in energy-related sectors. EU-level evidence indicates that women represent roughly a quarter of employees in the energy sector, and they are less represented in supervisory and decision-making roles. (EIGE, Gender Equality Index 2023).
- **Renewables and leadership:** Global evidence on renewables suggests that women represent around one-third of the renewable-energy workforce, with lower representation in STEM-intensive positions and in senior management. (IRENA, 2025; IEA, 2021/2022).



1.2 Main findings from the national reports

While each country presents specificities, the national reports converge on a shared set of patterns. The most recurrent findings are summarised below:

- **Gender segregation in VET remains strong.** Where data are available, women represent a small minority in technical VET families linked to energy, electronics, mechanics and ICT, while they are a large majority in care-related fields.
- **Cultural barriers outweigh formal barriers.** Even where equality frameworks exist, stereotypes, micro-sexism and the perception of “male domains” still shape choices, confidence and belonging.
- **A “pipeline paradox” emerges across contexts:** girls who enter technical pathways often perform well, yet they may feel isolated, face a hidden curriculum (e.g., boys leading while girls are relegated to supportive tasks), and struggle to see a future self in the sector without mentoring and supportive peer communities.
- **Workplace cultures and transition points matter.** Apprenticeships, internships and early job experiences can act either as accelerators or as exit points, depending on whether workplaces are safe, inclusive and responsive to work-life realities.
- **Intersectional inequalities are decisive.** Barriers increase for girls from low-income backgrounds, rural areas, migrant communities, and for girls with disabilities, due to compounding constraints (transport, costs, discrimination, limited networks and limited access to information).



Some highlights

From Dutch interviews

Keyword	Meaning / reflection
“Work twice as hard”	Persistent gender bias and validation gap.
“Real man’s world”	Masculine culture still dominant.
“Earn my place”	Individual effort compensates for systemic barriers.
“Safe environment”	Comfort measures without structural equality.
“Curiosity”	Empowerment through self-driven learning.
“Dirty / dangerous”	Industry image deters women.
“Role models”	Visibility as a catalyst for change.
“Change the system, not the girls”	Call for structural reform over individual adaptation.



From Portuguese interviews

- **Persistent gender stereotypes** discouraging girls from technical/STEM tracks.
- **Strong family influence and gendered expectations** shaping choices early.
- **Low female participation in technical VET and clean-energy pathways**, with “minority status” undermining belonging.
- **Gender-neutral (“inclusive but not targeted”) institutional/industry approaches** that fail to close gaps.
- **Need for mentoring and role models**, but limited by low numbers of women in the sector.
- **Early interventions and systemic reform** (guidance, curriculum, materials, culture) as prerequisites for change.
- **Occupational and task segregation**: women concentrated in non-core technical roles; traditional task allocation persists.
- **Workplace bias and authority/recognition gaps**: women’s expertise questioned, higher performance expectations, subtle sexism - especially in leadership.
- **Granular “data ecosystem” insight**: higher education collects meaningful demographic data; schools often collect data mainly for social support; some VET providers integrate background data from the start - yet equity planning remains weak.
- **Intersectional mechanism**: gender bias compounded by prejudice against foreign/migrant students.
- **Concrete logistical barrier**: remote industrial sites and fieldwork conditions disproportionately deter young women.
- **Structural supply-side issue**: some VET contexts do not offer clean-energy courses, so “choice” is constrained by availability.
- **Psychosocial lever**: “normalising failure” as a resilience/empowerment strategy for girls entering male-dominated fields.
- **External empowerment networks** beyond schools/companies (e.g., community/cooperative networks) strengthening visibility and solidarity.



From Spanish interviews

“We cannot only invite girls to robotics workshops once a year and expect structural change,” said one policymaker. *“The message needs to reach parents, teachers, and the companies where these students will go next”* (Policymakers);

“We should move from isolated ‘gender projects’ to a transversal culture where equality is embedded in every classroom and workshop,” summarised one VET coordinator (VET practitioners);

“The problem is not that we reject women; the problem is that they rarely apply,” the respondent observed. *“That’s why visibility and mentoring are essential—we need to show that these careers are possible and rewarding”* (Industry);

*“When I mentor younger women, I always tell them: **you don’t need to adapt to the system - help change it**”* (Women in the clean and renewable energy sector);



From Greek interviews

All participants shared a message of encouragement and resilience:

They urged young women to **follow their passions, believe in their capabilities, and not be limited by stereotypes. Success in clean energy and STEM requires confidence, preparation, and solidarity - but it also brings the reward of contributing to a sustainable and equitable future.**



From Italian interviews

"In middle school, many girls say 'I'm not interested,' but they don't really know what it is. They've never seen a lab" (Education)

"For profiles where you literally work on installations, the imaginary is still very male"
(Industry)

"It still happens that people think: 'Who is this young woman telling me what to do?'"
(Industry)

"We still see girls underrepresented in the best-paid and fastest-growing sectors" (Policy)

"If you make it practical and connected to daily life, perception changes" (Education)

"We need to normalise women's presence in technical fields, not celebrate it as an exception" (Policy)

"Clean energy is not just a technological choice, but a moral and social responsibility"
(Industry)

"Anthropology, both of traditions and contemporary contexts, studies many populations that have organized their production, including energy, in unprecedented ways. Native women are protagonists of movements for the protection of forests, oceans and life on our planet. Dialoguing with these subjectivities would allow us to see science with different eyes, to see its direct application in the world, its impact on the well-being of all living beings and its revolutionary scope. In short, it would remove from the rhetorical story of who and what a scientist is. The indigs populations of the Amazon do science, the women of India do science in favor of their communities starting from the protection of nature". (Expert in gender issues)

1.3 Strategic directions

The Blueprint translates findings into recommendations at EU, national/regional, education-provider and employer levels. The most strategic directions are:

- 1 Move from fragmented initiatives to systemic strategies:** embed gender equality objectives and indicators in VET governance, quality assurance and funding mechanisms.
- 2 Start earlier and broaden the narrative:** shift guidance and outreach to earlier ages, involve families, and connect clean energy to social purpose, sustainability and community well-being.
- 3 Institutionalise mentoring and role-model ecosystems:** create structured networks that connect girls and young women to diverse professionals and peers, avoiding tokenism and supporting collective empowerment.
- 4 Transform learning and working environments:** invest in gender-transformative pedagogy, inclusive communication, bias-aware assessment and guidance, and safe workplace standards (anti-harassment, facilities, flexible arrangements).
- 5 Make intersectionality operational:** provide targeted supports (scholarships, transport, accessibility, bridging courses) and collect disaggregated data to make invisible barriers visible.



2. Introduction

2.1 Context: why girls' participation in clean energy studies matters

Europe's clean energy transition is not only a technological shift; it is a social, economic and cultural transformation that requires new skills, new occupations and new imaginaries. The shift towards renewable energy, energy efficiency, electrification, smart grids and sustainable mobility is creating demand for technicians, installers, maintenance workers, energy managers, data specialists, system designers and many other profiles. Gender equality is central to a just transition. When women and girls are absent from the education pipeline and from the sector's jobs and decision-making, the transition risks reproducing existing inequalities and overlooking knowledge and needs that are essential for sustainable outcomes. Increasing girls' participation in clean energy-related studies is therefore **both a matter of rights and a matter of quality: diverse teams contribute to innovation, safety, and better service design, while inclusive institutions are more resilient and responsive to societal change.**

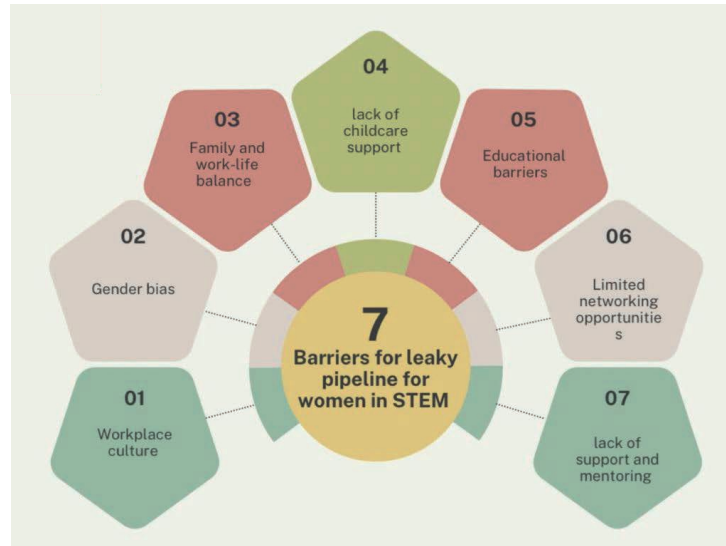
The national reports show that clean energy is frequently perceived as a "male-coded" field, associated with heavy industry, fieldwork, physical strength and masculine workplace cultures. Even when the actual jobs in renewables include digital, analytical, planning, customer-oriented and community-based roles, the dominant image remains male-coded. These perceptions intersect with wider gender norms that still associate girls with care, communication and "soft" roles. The result is a restricted horizon of possibilities - not because girls lack capability, but because systems constrain what seems thinkable, safe and socially acceptable.

2.2 Women in STEM and in the clean energy sector: a European snapshot

European-level indicators confirm that gender gaps are structural and persist across the education-to-employment pipeline. While trends vary by country and region, the overall picture is one of **horizontal segregation** (women concentrated in some fields and men in others) and **vertical segregation** (women underrepresented in senior and decision-making positions).

- **Education pipeline.** At EU level, women represent around one in three STEM graduates (Eurostat, 2022) and around one in five ICT specialists (Digital Decade Progress Report, 2024). Women also remain underrepresented among scientists and engineers, although their overall share increased slightly between 2011 and 2020 (from about 39% to 41%). These gaps reflect differential access, encouragement, expectations and belonging. (*European Commission – European Education Area; last updated 20 June 2025*).

- **Energy and green transition employment.** Gender segregation is also visible in the green transition. EU-level evidence indicates that women represent roughly a quarter of employees in the energy sector and remain underrepresented in supervisory and decision-making roles. Global evidence specific to renewables suggests that women represent around one-third of the renewable-energy workforce, with lower representation in STEM-intensive roles and in senior management. This matters because the clean energy transition includes not only engineering but also digital, data and systems roles that are frequently shaped by male-dominated cultures. (EIGE, Gender Equality Index 2023.) (IRENA, 2025.)



- **Intersectionality.** European data and the national reports both indicate that gender gaps can be compounded by other inequalities. Migration status, socio-economic background, territorial inequality and disability can shape access to STEM education and to clean energy jobs, while data availability remains limited in many official datasets. This Blueprint therefore treats intersectional inequality as a core, cross-cutting dimension - not an add-on.

2.3 Objectives and overview of the Blueprint

This Blueprint aims to:

- Synthesize and compare evidence from the STAR Girls national reports to identify common patterns and country-specific differences in the factors that impede or facilitate girls' choices related to clean energy studies.
- Translate findings into an actionable framework for education providers, policymakers, industry and civil society, aligned with EU priorities on green skills, gender equality and social inclusion.
- Provide an intersectional and feminist analytical approach that supports a shift from tokenistic "inclusion" to structural equality and institutional transformation.

2.4 Methodology of the research

The Blueprint is based on the STAR Girls WP2 Task T2.2 research process, which combined desk research and qualitative stakeholder interviews in each participating context. The synthesis presented here does not replace national reports; rather, it consolidates their findings into a comparative and European-oriented analysis.

Mixed-methods logic. Desk research provides the structural picture (policies, labour market data, participation rates, mapped initiatives), while interviews provide insight into mechanisms and lived experience (how stereotypes operate, how guidance is delivered, how workplaces are experienced, and what motivates girls when they do choose technical paths). Triangulating these sources reduces the risk of one-dimensional explanations and supports more robust recommendations.

Comparability with respect for context. Partners followed a shared research framework and common thematic categories (labour market data; gender and career choice; girls' participation in VET/STEM; policy documents; grey literature), while adapting data collection to national and regional realities. This makes it possible to compare patterns across countries without erasing local specificities.

2.4.1 Stakeholder interviews: overview of samples

The national reports included semi-structured interviews with stakeholders across the clean and renewable energy ecosystem (education, policy and industry) and with women working in the sector. The total number and composition of interviews varied by country, and in order to ensure fair gender representation, more than half of the respondents were women.

Country/context	Total interviews	Stakeholder profile (as reported)	Gender breakdown
Spain	14	5 VET practitioners/equality officers; 5 policymakers; 3 women professionals; 1 industry representative	11 women
Portugal	11	3 VET practitioners; 2 policymakers; 4 women professionals; 2 industry representatives	9 women
Greece	10	3 policymakers; 4 VET educators; 3 women professionals in clean energy	7 women
Netherlands	13	Professionals from technical sectors, HR representatives and teachers	10 women
Italy	10	2 policy makers, 2 VET educators, 6 industry representatives	10 women

2.4.2 Analytical framework: intersectional, feminist, and critical-inclusivity approach

- **Intersectionality.** The Blueprint adopts an intersectional lens, recognising that **gender is not a single-axis experience. Girls' opportunities and constraints are shaped by the interaction between gender and other dimensions** such as socio-economic status, migration background, place of residence (urban/rural), disability, and family educational capital. In practice, this means that barriers are not simply additive: they can multiply and change form across contexts.
- **Feminist and gender-transformative perspective.** The analysis is grounded in the idea that gender inequality is structural and embedded in institutions, norms and power relations. Therefore, the goal is not merely to support individual girls to "fit into" existing systems, but to transform educational and workplace environments so that they are safer, more equitable and more plural. This includes questioning the "hidden curriculum" of gendered expectations, the masculinisation of technical authority, and the normalization of male-only spaces.
- **The "hidden curriculum of gendered expectations".** It is a **mechanism of reproduction of power** that refers to the implicit messages, norms, and everyday practices through which students learn what is considered appropriate, possible, or desirable for them based on gender, even when no explicit discrimination is stated. The hidden curriculum includes everyday practices such as who is encouraged to use technical equipment, how mistakes are interpreted, which role models appear in teaching materials, and how guidance is framed. Although informal and often unconscious, these practices systematically reinforce the idea that technical competence belongs to boys rather than girls. In VET and STEM contexts, this hidden curriculum subtly reinforces the idea that technical competence, risk-taking, and leadership are masculine, while care, support,

and caution are feminine, thereby contributing to girls' underrepresentation in clean energy pathways².

- **Critical inclusivity.** In this Blueprint, **the term “inclusive” is used critically.** Inclusion can unintentionally imply that someone - often positioned within a dominant or privileged group - acts as a gatekeeper who decides who belongs “inside” and who remains “outside”. For this reason, inclusion is treated here as a starting point rather than an end point. **The objective is to create conditions of openness, pluralism and the valorisation of differences, while actively deconstructing the systems and norms that produce exclusion.** Applied to VET and clean energy pathways, this means shifting from ‘helping girls adapt’ to transforming the environments, rules and cultures that define competence and belonging.

2.4.3 Ethical considerations, quality assurance and limitations

Across contexts, partners applied ethical standards such as informed consent, confidentiality and sensitivity to participants' experiences.

Interviewing was conducted in a semi-structured format to balance comparability with openness to participants' priorities and narratives.

Quality assurance relied on triangulation across sources (desk research plus interviews), thematic coding, and internal cross-checking among project teams. However, limitations must be acknowledged: (i) the number of interviews is necessarily small and not statistically representative; (ii) intersectional data are limited in many official datasets; (iii) some regions lack disaggregated data on employment in specific renewable-energy sub-sectors; and (iv) reporting formats differ across national reports, including the level of detail provided on interview sample characteristics.

Despite these limitations, the Blueprint provides a robust evidence-informed basis for action because it identifies consistent patterns across multiple contexts and stakeholder groups, and because the qualitative insights illuminate mechanisms of exclusion and facilitation that are often invisible in quantitative data.

² The “hidden curriculum” refers to the implicit messages, norms, and practices through which students learn what is considered appropriate or expected of them, even when no formal rule or policy is stated. In the context of STEM, VET, and clean energy education, the hidden curriculum operates in multiple ways:

In classroom interactions

- Teachers unconsciously **call on boys more often** during technical problem-solving or practical demonstrations.
- Girls are praised for being **careful, organised, or compliant**, while boys are praised for being **bold, inventive, or technically skilled**.
- Mistakes made by boys are framed as part of learning, while similar mistakes made by girls are interpreted as lack of aptitude.

In laboratories and workshops

- Boys are more frequently encouraged to **handle tools, machinery, or equipment**, while girls are assigned documentation, observation, or support tasks.
- Protective comments such as *“this machine is heavy”* or *“this might be dangerous”* are disproportionately directed at girls, reinforcing perceptions of fragility.

In teaching materials and examples

- Textbooks and learning materials predominantly depict **men as engineers, technicians, and inventors**, with women shown in supportive or non-technical roles.
- Examples and case studies rarely include women working in energy production, infrastructure, or technical maintenance.

In career guidance and orientation

- Guidance counsellors implicitly steer girls towards **“safer” or more “compatible” careers**, suggesting that technical or field-based roles may be demanding or unsuitable.
- Girls expressing interest in technical pathways are framed as *exceptions* or as “very brave,” subtly signalling that these choices are unusual.

In peer culture and school climate

- Girls in technical classes are treated as **representatives of their gender** rather than as individuals, increasing pressure and visibility.
- Jokes, informal comments, or humour that normalise technical competence as masculine go unchallenged.

In institutional expectations

- Success in technical fields is implicitly associated with **long working hours, physical availability, and competition**, discouraging those who do not align with these norms.
- Collaboration, communication, and social skills—often associated with girls—are undervalued, despite being essential in clean energy professions.

3. Impeding Factors

This section presents the main impeding factors that limit girls' access to, participation in, and completion of clean energy-related studies, with a specific focus on VET pathways.

3.1 Societal and cultural barriers

Across all national reports, **societal and cultural norms emerge as the most pervasive barriers**. These barriers shape aspirations and perceived “fit” long before girls encounter a specific course catalogue or an apprenticeship offer. They operate through families, peers, media, community expectations and broader gender regimes that assign different values, risks and rewards to “male” and “female” trajectories.

The clean energy sector is often imagined through industrial and masculine frames: heavy equipment, fieldwork, physicality, remote sites, and “hard” technical competence. Even when renewable-energy work includes digital, analytical, planning, maintenance, communication and service roles, the dominant image remains male-coded. This imaginary discourages girls and can produce self-selection out of pathways even when formal barriers are absent.

3.1.1 Gender norms, stereotypes and the masculinisation of technology

Stereotypes about who is naturally “good” at technology and who belongs in technical spaces create a cumulative disadvantage.

The national reports consistently highlight the following mechanisms:

- Lower self-confidence in STEM among girls despite equal performance, especially during adolescence.
- Social messages associating femininity with care and communication, and masculinity with machines, rationality and leadership.
- Micro-level discouragement (jokes, comments, subtle exclusions) that signals to girls that they are “out of place”.
- Expectation management: girls are encouraged to choose “safe” and socially approved careers, while boys are encouraged to take risks and pursue technical prestige.

3.1.2 Family expectations, peer culture and early socialisation

Families can be protective resources, but they can also reproduce stereotypes. Across national contexts, girls' choices are strongly influenced by:

- Parents' perceptions of what is “appropriate” or “safe” for daughters (physical safety, workplace culture, work-life balance).
- Differences in how boys' and girls' interests are supported through toys, hobbies and extracurricular activities.
- Peer dynamics, including fear of being “the only girl” or being labelled as unfeminine for choosing technical routes.

The **Italian** report underlines that the demand for a career that considers the domestic and care spheres as integral to girls' existence limits their options. Many opt for activities that allow for a balance between work and family, and science is portrayed as an all-encompassing field of research and work that leaves no room for anything else. This capitalist and highly performative narrative also needs to be overturned, starting to consider our choices as modular, as part of collective processes.

The **Basque** report emphasises the need to start guidance early and involve families, because stereotypes and expectations become harder to shift once study choices have been made. Across countries, there is evidence that families are more likely to support technical choices when they can connect them to social purpose and sustainability.

3.1.3 Representation, role models and media narratives

A lack of visible and diverse women in technical and energy roles was repeatedly cited as a barrier. **The issue is not merely the absence of role models, but the narrowness of the representations that do exist.**

When girls only see exceptional “superwomen” who succeed by assimilating to masculine norms, the message can become: ‘you have to be extraordinary to belong’. This can discourage girls who are curious and capable, but do not identify with heroic or competitive narratives. From a feminist perspective, **role modelling should therefore support normalisation and pluralisation: showing multiple ways of being competent, highlighting collective support structures, and making room for diverse bodies, identities and life situations.**

The **Portugal** interviews illustrate this challenge: some companies reported having no specific initiatives to attract women, relying instead on general or symbolic actions. Such approaches rarely change representation in technical and operational roles.

3.1.4 Intersectional dimensions of cultural exclusion

Cultural barriers are not the same for all girls. Across national reports, barriers intensify for girls who experience other forms of marginalisation. The following intersectional mechanisms were most frequently mentioned:

- Socio-economic constraints (costs, opportunity costs, limited networks, fewer extracurricular opportunities).
- Territorial inequality (rurality/peripherality leading to limited course availability, longer travel times and reduced access to internships).
- Migration-related barriers (language barriers, discrimination, reduced access to information about pathways and rights).

Disability-related barriers (physical accessibility of workshops and workplaces, lack of adapted equipment, low expectations).

Gender policing and stigma affects LGBTQI+ young people in male-dominated spaces.

The **Basque** report explicitly notes that barriers increase for girls from low-income, migrant, rural or disabled backgrounds and that support programmes can be unevenly distributed.

The **Italian** report underlines that schools are highly classist, and both **horizontal and vertical mobility is increasingly problematic**. Restoring a balance of choice and opportunity requires an alliance with the institutions.

3.1.5 Anticipated workplace discrimination as an educational barrier

A key insight across interviews is that girls often anticipate discrimination and therefore avoid pathways they perceive as hostile. This anticipation is not irrational: women professionals describe micro-sexism, competence undervaluation and task segregation.

Examples include being excluded from field tasks, having authority questioned by older male teams, and experiencing sexist comments. These narratives matter for education because they circulate informally among students and families, shaping reputational knowledge about sectors and influencing course selection.

While all national reports identify persistent gender stereotypes and cultural norms that discourage girls from technical and clean-energy-related pathways, the way these barriers manifest differs across countries:



Italy: Societal and cultural barriers emerge **very early**, often between the ages of 11 and 13. Gendered expectations are reinforced through family influence, school orientation practices, and a pervasive *hidden curriculum* that subtly discourages girls from technical fields. These barriers are largely normalised and embedded in everyday educational and social practices.



Greece: Cultural barriers are **more explicit and normatively enforced**. Traditional gender roles and strong family expectations clearly shape educational choices, with technical and engineering pathways widely perceived as incompatible with femininity or future care responsibilities. Girls entering technical VET are often viewed as exceptions.



Spain (Basque Country): Gender segregation is **highly normalised and territorially rooted**. Technical and industrial pathways are socially coded as masculine, while care- and service-oriented pathways are feminised. Family influence is significant but closely intertwined with local labour-market expectations and socio-economic context.



Portugal: Societal barriers are characterised by a **tension between progressive equality discourses and persistent stereotypes**. While gender equality is strongly promoted at a rhetorical level, traditional expectations continue to influence girls' choices, often remaining invisible under formally neutral or inclusive frameworks.



Netherlands: Cultural barriers tend to be **more subtle and individualised**. Strong emphasis on personal choice and autonomy can obscure structural and cultural constraints, framing gendered educational outcomes as individual preferences rather than the result of systemic socialisation and unequal encouragement.

3.2 Educational system barriers

Educational systems are not neutral channels: they shape aspirations, distribute opportunities and signal who belongs. The national reports show that barriers emerge at multiple stages- primary and lower-secondary schooling, career guidance moments, VET enrolment processes, and the school-to-work transition through internships and apprenticeships.

3.2.1 Curriculum and early exposure to applied STEM and energy topics

Several national reports emphasise that girls often receive limited early exposure to applied STEM and technical problem-solving. When STEM is presented as **abstract, competitive or detached from social meaning, it can become less attractive** - especially for students who have not been socialised to see themselves as "technical".

In **Portugal**, interviewees explicitly called for more technical and practical subjects from early education onwards. Without early exposure to hands-on making, repair, experimentation and sustainability projects, girls may not develop the confidence and familiarity that helps later study choices.

- Limited opportunities for experimentation and hands-on learning in early schooling.
- Gendered expectations about who should handle tools, electronics, coding or mechanical tasks in school activities.
- Sustainability and energy topics are often framed as abstract or policy-oriented, rather than as tangible technical challenges and opportunities.

3.2.2 Career guidance, counselling and the hidden curriculum

Career guidance is a decisive junction in the pipeline. The national reports consistently indicate that **guidance practices can unintentionally reinforce stereotypes**, particularly when counsellors and teachers carry implicit expectations about “suitable” paths for girls and boys.

Guidance is also shaped by information asymmetries: many students (and families) choose courses without a clear understanding of what the profession involves, what progression looks like, and what working conditions may be.

The **Basque** report provides a clear example: even in centres with equality awareness, patterns such as ‘boys leading, girls documenting’ can persist. These micro-practices teach students what kinds of roles are expected and legitimate.

When information is scarce, stereotypes fill the gap:

- Beyond formal guidance, a “hidden curriculum” operates in classrooms, workshops and labs, and also implicit bias in counselling and teacher expectations.
- Gendered task allocation in workshops and group work (leadership vs support roles).
- Promotional materials and course descriptions that primarily feature male imagery and narratives of masculinity-coded competence.
- Assessment and feedback patterns that reward confidence and assertiveness (often socially encouraged in boys) over quieter forms of competence.

3.2.3 Participation patterns in VET: segregation and the ‘pipeline paradox’

The national reports show strong gender segregation in VET.

In the **Basque** Country, women represent only a small minority in technical VET families linked to energy, electronics, mechanics and IT, while they are a majority in care-related fields. The same gendered division is reflected in the labour market.

A recurring pattern is the “**pipeline paradox**”: even in VET centres that invest in equality and inclusive practices, female enrolment can remain low. Girls who do enrol often perform well, but they may feel isolated and be treated as exceptions. **This can create a fragile sense of belonging and a higher risk of exit at critical moments (first workshop experiences, first internship, first negative comment).**

In **Greece**, interview findings describe extremely low female participation in some technical and energy-related specialisations. In one VET department referenced by educators, there was only one female student out of nineteen. At one Greek training institution, women represented around 29% of the overall student population but only about 16.4% in energy and technical programmes.

3.2.4 Access and retention barriers: costs, transport and time

Educational participation is shaped by material conditions. Intersectional barriers become particularly visible when programmes require travel, specialised equipment, or time commitments that conflict with care responsibilities or paid work:

Transport and geographic distance to specialised VET centres and industrial sites, particularly for rural students.

- Cost of equipment, protective gear and learning materials (especially when not provided).
- Time constraints related to care responsibilities or paid work, which disproportionately affect girls in some contexts.
- Limited accessibility for students with disabilities in workshops, labs and industrial placements.

National reports highlight that when support exists (scholarships, transport aid, accessibility measures), it is often unevenly distributed and are not systematically embedded in policy frameworks.

Geographic factors also matter. For example, **Portugal** interviews describe how remote industrial sites can be difficult to access and unattractive for young women, particularly when relocation would mean moving away from family support networks. Such structural realities intersect with cultural expectations and can reduce the perceived feasibility of entering the sector.

3.2.5 School-to-work transition barriers: internships, apprenticeships and workplace entry

The transition from education to employment is a high-risk stage in the pipeline. Internships and apprenticeships can provide motivation, professional identity and networks—but they can also expose students to exclusionary cultures.

Across countries, stakeholders reported that workplaces in the energy sector and related industries can be male-dominated and resistant to change, leading to experiences of micro-sexism, undervaluation and exclusion from field tasks. **When girls encounter discrimination during a placement, the effect is often amplified because they may already feel isolated as a minority.**



Italy: Low female participation in technical and STEM-oriented VET persists due to gender-biased or gender-blind career guidance, limited early hands-on exposure, and a hidden curriculum that discourages girls from technical pathways.



Greece: Extremely low female enrolment in technical VET reflects insufficient early orientation, lack of gender-sensitive guidance, and limited institutional support for girls entering male-dominated courses.



Spain (Basque Country): Structural segregation across VET tracks begins early and intensifies over time; career guidance often reinforces traditional pathways, and transitions from education to technical employment lack continuity.



Portugal: Gender gaps persist across STEM and VET due to formally neutral educational policies, uneven territorial access to guidance and initiatives, and limited targeting of girls within the education system.



Netherlands: Gender-neutral education and guidance approaches fail to counteract stereotypes; limited use of gender-disaggregated and intersectional data weakens strategic planning and targeted interventions.

3.3 Institutional and policy barriers

Institutional and policy barriers refer to the rules, governance arrangements, funding mechanisms and organisational cultures that shape education and employment systems. Across the national reports, the most significant institutional barrier is the persistence of **'gender-neutral' or 'gender-blind' approaches** that treat equality as already achieved, thereby failing to address structural exclusion.

3.3.1 Gender-blind policies and the limits of formal neutrality

In several contexts, stakeholders described equality as a matter of treating everyone the same. While equal treatment is important, formal neutrality can conceal unequal starting points, unequal risks and unequal burdens. For example, companies may claim to have equal opportunities while offering **no targeted measures to counteract stereotypes**, support minority students during placements, or redesign work environments to accommodate diverse bodies and life situations.

Portugal interviews illustrate this: some companies reported having no specific initiatives to attract women, or relying on general programmes that do not explicitly address gendered barriers. Symbolic actions (e.g., single-day events) were perceived as insufficient when unaccompanied by structural measures.

3.3.2 Data gaps, monitoring and accountability deficits

A recurring challenge across countries is the lack of consistent gender-disaggregated and intersectional data - especially regarding VET participation by specialisation, transition outcomes, and employment in specific renewable-energy subsectors. **When data are missing, institutions cannot identify where inequalities are produced, and interventions are harder to evaluate.**

- Limited disaggregated data on renewables and clean energy jobs (often grouped into broader industrial categories).
- Inconsistent tracking of VET students' transitions into apprenticeships, employment and further education.
- Limited intersectional statistics (e.g., gender by migration status, disability, region) in many datasets.
- Weak monitoring of gender equality objectives in education and energy policies, leading to limited accountability.

3.3.3 Fragmented initiatives and short-term funding

National reports describe many promising practices (mentoring programmes, outreach campaigns, equality plans), but they are often project-based, fragmented and dependent on short-term funding. This fragmentation creates unequal coverage across regions and institutions and can lead to discontinuity for students. The **Basque** report, for example, highlights a rich ecosystem of initiatives, but also notes that long-term impact evaluation is difficult because many initiatives are recent or evolving. The **Netherlands and Italian** report similarly points to limited structural funding for gender equality and the risk that policies remain aspirational without stable resources.

3.3.4 Institutional culture in VET centres and companies

Institutions reproduce culture through everyday practices. **Even when equality is endorsed at policy level, organisational culture can remain male-normed** in workshops, apprenticeship sites and company teams.

- Lack of gender-sensitive teacher training and limited institutional support for inclusive pedagogy.
- Workshops and equipment designed around male bodies and assumptions (e.g., protective gear, facilities).
- Male-dominated teams and resistance to women's authority, especially in field roles.
- Tolerance of micro-sexism and limited reporting mechanisms for harassment or discrimination.
- Recruitment and selection practices that rely on informal networks or stereotyped criteria.

Portugal interviews provide concrete examples: women engineers reported being excluded from field monitoring tasks and described difficulties being accepted as leaders by older male teams. Such experiences signal to girls that the workplace may be unsafe or devaluing, reinforcing self-selection out of the sector.

3.3.5 Policy coherence gaps across education, energy and equality agendas

Finally, national reports indicate that **education policy, equality policy and energy policy are often insufficiently aligned**. For example, energy strategies may emphasise skills demand without integrating gender equality targets, while education reforms may address STEM skills without addressing workplace inclusion. This lack of policy coherence limits the scale and sustainability of change.

A European-oriented response requires integrating gender equality into green skills strategies, connecting VET governance to labour-market regulation, and ensuring that public investments in the energy transition also create inclusive pathways.



Italy: Despite national gender-equality strategies and EU funding, policies remain weakly implemented in technical education and clean energy sectors; lack of coordinated monitoring and targeted measures limits impact.



Greece: Gender equality policies exist but are unevenly operationalised; limited use of gender-sensitive indicators and fragmented coordination between education, labour, and energy policies constrain effectiveness.



Spain (Basque Country): Strong regional policy frameworks coexist with gaps in implementation; initiatives are often project-based and insufficiently institutionalised, with limited accountability mechanisms.



Portugal: A formally inclusive and progressive policy discourse masks the absence of targeted measures; “gender-neutral” approaches dominate, reducing the capacity to address structural inequalities.



Netherlands: Advanced policy frameworks and institutional awareness are offset by reliance on gender-neutral instruments; insufficient intersectional data and limited accountability weaken transformative potential.



Italy

Societal and cultural barriers: Gender stereotypes emerge very early and are reinforced through family influence, school orientation, and a pervasive *hidden curriculum* that normalises girls’ underrepresentation in technical fields.

Educational system barriers: Low female participation in technical and STEM-oriented VET persists due to gender-biased or gender-blind guidance, limited early hands-on exposure, and fragmented orientation pathways.

Institutional and policy barriers: Despite national gender-equality strategies and EU funding, implementation in technical education and clean energy sectors remains weak, with limited monitoring and targeted measures.



Greece

Societal and cultural barriers: Strongly traditional gender norms and explicit family expectations discourage girls from technical pathways, often perceived as incompatible with femininity and future care roles.

Educational system barriers: Extremely low female enrolment in technical VET reflects insufficient early orientation, lack of gender-sensitive guidance, and limited institutional support for minority girls.

Institutional and policy barriers: Gender equality policies exist but are unevenly operationalised; limited use of gender-sensitive indicators and fragmented cross-sector coordination constrain effectiveness.



Spain (Basque Country)

Societal and cultural barriers: Gender segregation is highly normalised and shaped by local socio-economic and labour-market contexts, with technical pathways coded as masculine and care-related pathways as feminine.

Educational system barriers: Structural segregation across VET tracks begins early and intensifies over time; guidance often reinforces traditional pathways, and school-to-work transitions lack continuity.

Institutional and policy barriers: Strong regional policy frameworks coexist with implementation gaps; initiatives are often project-based and insufficiently institutionalised, with limited accountability mechanisms.



Portugal

Societal and cultural barriers: Persistent stereotypes operate beneath a progressive equality discourse, with formally neutral approaches masking cultural norms that continue to shape girls' educational choices.

Educational system barriers: Gender gaps persist due to gender-neutral education policies, uneven territorial access to guidance and initiatives, and limited targeting of girls within STEM and VET pathways.

Institutional and policy barriers: Inclusive rhetoric is not matched by targeted action; the dominance of neutrality reduces the capacity to address structural gender inequalities.

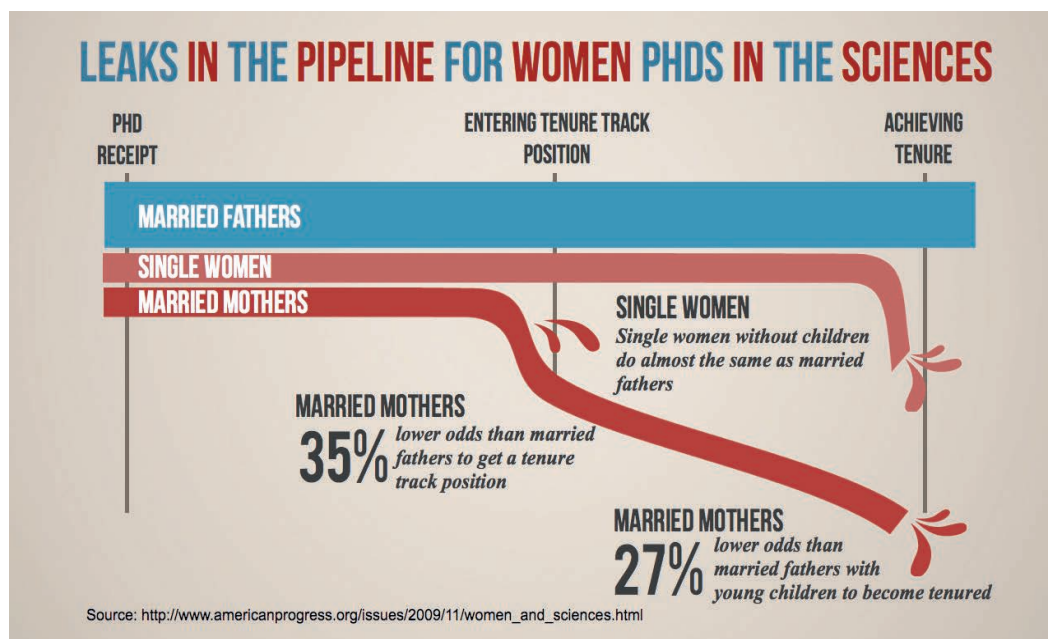


Netherlands

Societal and cultural barriers: Cultural barriers are more subtle and individualised, with strong emphasis on personal choice obscuring structural and social influences on gendered participation.

Educational system barriers: Gender-neutral education and guidance approaches fail to counteract stereotypes; limited use of gender-disaggregated and intersectional data weakens strategic planning.

Institutional and policy barriers: Advanced policy frameworks rely heavily on neutral instruments; insufficient accountability and intersectional monitoring limit transformative impact.



4. Facilitating Factors

Facilitating factors are the conditions, practices and structures that increase the likelihood that girls will consider, choose and remain in clean energy-related studies. Importantly, facilitating factors do not only support girls' entry into programmes; they also support belonging, confidence, progression and transition to employment (see Appendix A).

4.1 Societal and cultural enabling factors

Societal and cultural enabling factors reshape what is imaginable and socially supported. The national reports suggest that change is most likely when girls see clean and renewable energy not as a masculine industrial domain, but as a socially meaningful and diverse sector linked to **sustainability, innovation and community well-being**.

4.1.1 Connecting clean energy to purpose, sustainability and social impact

Many stakeholders observed that girls' motivation increases when technical learning is connected to real-world meaning: climate action, community resilience, energy justice, and improving everyday life. This can counteract stereotypes that portray technology as cold, abstract or detached from social value.

- Project-based learning on renewable energy, energy efficiency and sustainable mobility that connects technical skills to tangible outcomes.
- Storytelling and outreach that frames clean energy as socially relevant and future-oriented, rather than as heavy industry.
- Showcasing diverse job roles (not only engineers): technicians, installers, data specialists, energy advisors, maintenance workers, project managers and community coordinators.

4.1.2 Role models and mentoring as 'constellations' rather than exceptions

Across countries, **role models and mentoring are among the most consistently cited facilitating factors**. However, the national reports and the STAR Girls approach suggest an important nuance: **role models should not be presented as isolated exceptions**. Instead, girls benefit from 'constellations' - networks of mentors, peers and allies that normalise women's presence and provide practical support.

This approach reduces the risk of tokenism and supports collective empowerment. It also makes room for diversity: girls can identify with different professional styles, backgrounds and life trajectories.

4.1.3 Family and community engagement that shifts expectations

Families and communities can become key allies when they are actively engaged and provided with credible information about pathways, jobs and opportunities. Enabling conditions include:

- Parent engagement initiatives that demystify technical professions and address fears about safety, workplace culture and work-life balance.
- Community-based events where girls can try hands-on activities with support, reducing anxiety about 'not belonging'.
- Engagement of fathers and male caregivers as allies, while also supporting mothers and female caregivers to advocate for girls' technical aspirations.

4.1.4 Visibility of diversity and inclusive communication in media and outreach

Inclusive communication and representation were highlighted as practical levers in several reports. This in-

cludes using non-stereotyped imagery in promotional materials, ensuring gender-inclusive language, and representing diverse bodies and identities. When communication changes, it can signal institutional readiness and reduce stereotype threat.

4.2 Educational system enabling factors

Educational systems can be powerful enablers when they actively counter stereotypes, build competence and belonging, and provide supportive structures for minority students. The national reports highlight several enabling practices.

4.2.1 Gender-transformative pedagogy and inclusive learning environments

Gender-transformative pedagogy goes beyond ‘gender awareness’ to actively change practices that reproduce inequality. Across national reports, enabling conditions include:

- Teacher training on gender bias, stereotype threat and inclusive classroom management.
- Workshop practices that ensure equitable participation (rotating roles, explicit allocation of technical tasks, peer collaboration norms).
- Assessment practices that recognise diverse forms of competence and avoid rewarding only stereotypically masculine behaviours such as overconfidence.
- Safe learning environments with clear rules against sexist language and harassment, and accessible reporting mechanisms.

The **Basque** report emphasises that many equality initiatives in VET centres are recent and that embedding them into everyday teaching practices is essential for sustained impact. The **Netherlands** report similarly highlights the value of inclusive communication and the need to institutionalise gender-aware pedagogy.

4.2.2 Institutionalised mentoring and role-model networks

Mentoring is most effective when it is institutionalised rather than optional. The national reports suggest that mentoring should be designed as an ecosystem:

- Mentoring programmes connecting girls to women professionals in clean energy and related technical fields, with regular touchpoints.
- Peer mentoring among students (including near-peer models: older students mentoring younger students).
- Mentoring that includes practical support (navigating internships, dealing with micro-aggressions, building confidence in workshops).
- Training and support for mentors to avoid reinforcing stereotypes and to adopt a feminist and intersectional stance (e.g., recognising structural barriers and avoiding ‘you just need more confidence’ narratives).

In the **Basque case**, stakeholders recommend institutionalising mentoring and role-model networks as a core component of VET governance. **Greece** and **Portugal** interviews similarly highlight mentoring as crucial for retention and for countering isolation.

4.2.3 Hands-on experiences, labs, company visits and dual learning

Hands-on experiences can be decisive in transforming stereotypes into embodied competence. Enabling practices include:

- Maker spaces, labs and practical modules that allow girls to build technical confidence early.
- Company visits and job shadowing in clean energy workplaces that are prepared to host girls safely and inclusively.
- Dual learning and apprenticeship models that include gender-sensitive supervision and clear learning objectives.

- Project-based learning linked to renewable energy, energy efficiency and sustainability challenges in the local community.

The **Basque** Country is highlighted as a context with a strong dual-learning VET model and close links with industry. This is an enabling structural feature, provided that equality is embedded in placements and company partnerships.

4.2.4 Inclusive career guidance and outreach

Career guidance becomes enabling when it actively expands horizons rather than reproducing stereotypes.

Enabling guidance practices include:

- Starting guidance earlier (primary and lower secondary) rather than waiting until late decision points.
- Using gender-inclusive and intersectional materials that represent diverse job roles and diverse women.
- Providing clear information about training pathways, working conditions, progression opportunities and rights at work.
- Engaging families in guidance activities to shift expectations and reduce fear-based discouragement.
- Using behavioural insights (e.g., counter-stereotyped messaging, norm-setting, exposure to relatable peers) to challenge biased assumptions.

4.2.5 Intersectional support measures to enable access and retention

Finally, enabling conditions require material support - particularly for girls facing multiple barriers. The national reports highlight the importance of:

- Scholarships, stipends or targeted financial support for technical pathways.
- Transport support and coordination for students travelling to specialised centres or industrial placements.
- Accessibility measures in workshops and placements, including adapted equipment and inclusive safety standards.
- Bridging courses and tutoring to support students entering technical pathways without prior exposure.
- Psychosocial support and safe spaces (e.g., peer groups) to reduce isolation and support belonging.

4.3 Institutional and policy enabling factors

Policy and institutional frameworks can enable change when they create incentives, standards and accountability for gender equality in both education and employment. The national reports highlight the need to **shift from isolated projects to mainstreamed, resourced strategies**.

4.3.1 Gender mainstreaming and Gender Equality Plans

Gender mainstreaming means integrating gender equality objectives into all relevant policies, rather than treating them as separate programmes. Enabling mechanisms include:

- Gender impact assessments for education and labour market policies related to green skills and the energy transition.
- Gender Equality Plans (GEPs) in educational institutions and in organisations participating in publicly funded programmes, with measurable objectives and monitoring.
- Integration of equality indicators into VET quality assurance frameworks and accreditation criteria.
- Capacity building for policymakers and institutional leaders on gender-transformative approaches.

The **Netherlands** report provides examples of gender equality planning and monitoring in research and policy contexts and emphasises the importance of structural funding and oversight mechanisms.

4.3.2 Incentives, targets and conditional funding

Several reports highlight that voluntary commitments are often insufficient. Enabling change can require incentives and conditionalities, such as:

- Linking public funding for training, apprenticeships and sectoral programmes to demonstrable equality measures (e.g., safe placement standards, mentoring, gender-disaggregated reporting).
- Setting targets for participation and completion of girls in specific VET families, with accompanying support measures to avoid 'blame' dynamics.
- Creating incentives for companies to host inclusive internships and to recruit women into technical roles (e.g., recognition schemes, procurement criteria, sector agreements).

4.3.3 Partnerships and ecosystem approaches

The most promising approaches described in the national reports are **ecosystem approaches** that connect **VET providers, companies, public authorities and civil society**. Enabling partnership features include:

- Formal cooperation agreements between VET centres and companies that specify equality objectives and safe placement standards.
- Regional networks that coordinate outreach, mentoring and employer engagement, reducing fragmentation.
- Involvement of equality bodies and women's organisations to strengthen expertise and accountability.
- Shared data systems to track participation and transition outcomes.

In the **Basque** context, the existence of a developed VET system and strong institutional links with industry is a structural enabling factor. However, stakeholders stress that gender equality must become part of the core governance of these partnerships.

4.3.4 Safe and inclusive workplaces as a precondition for sustainable participation

Workplace inclusion is not only an employment issue; it shapes education choices through reputational knowledge and through internships. Enabling workplace conditions include:

- Clear anti-harassment and anti-discrimination policies, with trusted reporting mechanisms.
- Inclusive facilities and equipment (e.g., appropriate protective gear, changing rooms, sanitary facilities).
- Inclusive team cultures supported by leadership and by training for supervisors and mentors.
- Work-life balance measures that do not penalise women's careers (e.g., flexible scheduling, predictable hours, support for caregiving).
- Recognition and career progression pathways for technical roles, reducing informal gatekeeping.

Portugal interviews show that when workplaces remain resistant and male-dominated, women may be excluded from core tasks or have their competence undervalued. Conversely, companies that actively redesign workplace culture and practices can become key partners for attracting and retaining young women.

4.3.5 Monitoring, transparency and continuous learning

Finally, enabling institutional frameworks rely on monitoring and learning. This includes:

- Regular publication of gender-disaggregated (and, where possible, intersectional) data on VET participation, completion and transition outcomes.
- Evaluation of equality initiatives with both quantitative indicators and qualitative feedback from students.
- Mechanisms for continuous improvement: using data to adjust outreach, pedagogy, placement policies and employer partnerships.
- Sharing of good practices across regions and countries to accelerate learning.

Italy

- **Key facilitating factors:** Early hands-on exposure to technical activities, relatable female role models, and purpose-driven narratives linking clean energy to social and environmental impact.
- **Supportive mechanisms:** Scholarships, free access to post-secondary technical education (ITS), summer camps, and the emergence of hybrid professional roles combining technical, social, and organisational skills.



Greece

- **Key facilitating factors:** Inclusive and experiential pedagogy in laboratories, mentoring relationships, and targeted outreach activities that build confidence and technical self-efficacy.
- **Supportive mechanisms:** EU- and locally funded collaborations providing internships, work-based learning opportunities, and smoother transitions from education to employment.



Spain (Basque Country)

- **Key facilitating factors:** Structured mentoring and role-model initiatives, strong collaboration between VET providers, industry, and public authorities, and early orientation activities.
- **Supportive mechanisms:** Institutional partnerships that improve continuity across the education–training–employment pipeline and enhance the visibility of women in technical fields.



Portugal

- **Key facilitating factors:** Targeted programmes for women in STEM and energy, mentoring initiatives, and internship opportunities linked to sustainability and innovation agendas.
- **Supportive mechanisms:** Purpose-driven narratives connecting clean energy to societal value, alongside increasing awareness of skills demand in green sectors.



Netherlands

- **Key facilitating factors:** Mentoring and visibility initiatives, inclusive communication strategies, and the use of behavioural insights to challenge stereotypes.
- **Supportive mechanisms:** Structured collaboration between education and industry, where present, and growing institutional awareness of the need for gender-transformative approaches.



5. Recommendations

Recommendations are structured to support action at multiple levels: **European institutions, national and regional policymakers, VET providers and schools, companies and social partners, and cross-sector stakeholders.** They are grounded in the evidence from national reports and in the Blueprint's intersectional and feminist analytical approach.

5.1 Guiding principles for action

Across all recommendations, the following principles should guide design, implementation and evaluation:

- **Gender-transformative design:** address structures and cultures, not only individual girls' skills or confidence.
- **Intersectionality in practice:** design for diversity and provide targeted supports where multiple barriers intersect.
- **Critical inclusivity:** move beyond gatekeeping logic by transforming norms, spaces and definitions of competence and belonging.
- **Co-production and participation:** involve girls, students, educators and women professionals in designing interventions and communication.
- **Avoid tokenism:** invest in ecosystems (constellations) rather than isolated role models or one-off events.
- **Accountability and learning:** set measurable objectives, monitor progress, and adjust interventions based on evidence.

5.2 Recommendations at European level

European-level institutions and programmes can accelerate change by setting frameworks, funding priorities and accountability mechanisms. Key recommendations include:

- 1 **Integrate gender equality into EU green skills strategies and funding.** Ensure that EU programmes supporting green skills (including VET and reskilling) include gender equality objectives, indicators and minimum standards for inclusive delivery.
- 2 **Strengthen gender mainstreaming in the energy transition.** Encourage Member States to include gender equality targets in National Energy and Climate Plans (NECPs) and in energy transition investment plans, with clear links to education and employment measures.
- 3 **Require or incentivise Gender Equality Plans (GEPs)** for institutions receiving EU funding. Extend the logic of GEP conditionality beyond research to relevant VET and skills initiatives, with tailored guidance for VET providers and sectoral training bodies.
- 4 **Improve European data infrastructure.** Support harmonised indicators on girls' participation in technical VET families and on transitions into clean energy employment, including intersectional dimensions where feasible (gender by region, socio-economic status, migration, disability).
- 5 **Support cross-country learning and communities of practice.** Fund European platforms and exchanges that allow VET providers, companies and policymakers to share effective approaches (mentoring ecosystems, inclusive pedagogy, safe placements, communication strategies).



5.3 Recommendations for national and regional policymakers

National and regional authorities can create enabling systems by aligning education, equality and labour-market policies. Recommendations include:

- 1 **Embed gender equality targets in VET governance.** Integrate gender equality objectives into VET strategies, quality assurance and accreditation, with dedicated resources and clear responsibilities.
- 2 **Invest in early and sustained career guidance.** Ensure that guidance starts early (before key tracking decisions) and includes explicit counter-stereotyping, engagement of families, and practical exposure to clean energy-related work.
- 3 **Ensure equitable access through material supports.** Provide scholarships, transport support and accessibility measures for technical pathways, with targeted support for students facing multiple barriers.
- 4 **Strengthen regulation and incentives for inclusive apprenticeships.** Develop standards for safe and inclusive placements, with monitoring and consequences for non-compliance; incentivise employers who provide inclusive placements and recruit women into technical roles.
- 5 **Support regional ecosystems** rather than isolated projects. Create long-term funding lines for mentoring networks, outreach and teacher training, and coordinate initiatives to reduce fragmentation.
- 6 **Use procurement and public investment leverage.** Include equality criteria in public procurement and in investments in energy infrastructure and training, ensuring that public spending creates inclusive opportunities.

5.4 Recommendations for VET providers, schools and guidance services

VET providers and schools are **central change agents**. Recommendations include:

- 1 **Institutionalise gender-transformative teaching practices.** Provide continuous teacher training on gender bias, inclusive workshop practices and equitable task allocation; embed these practices in teaching standards and school development plans.
- 2 **Create mentoring and peer-support constellations.** Establish structured mentoring programmes with women professionals and near-peer mentors; create peer groups and safe spaces to reduce isolation and support belonging.
- 3 **Redesign communication and recruitment.** Audit promotional materials, open days and outreach to eliminate stereotyped imagery and language; ensure diverse representation and clear information on pathways and jobs.

- 4 **Strengthen guidance and information.** Ensure guidance counsellors are trained to challenge stereotypes; provide concrete information about clean energy jobs, progression pathways, wages, and working conditions; engage families systematically.
- 5 **Ensure safe and inclusive learning environments.** Adopt clear anti-harassment policies, accessible reporting, and visible institutional commitment; ensure facilities, equipment and protective gear are inclusive.
- 6 **Monitor participation and progression.** Track enrollment, completion and transition outcomes by gender and, where feasible, by other dimensions; use data to identify where girls exit the pipeline and to adjust interventions.

5.5 Recommendations for companies, employers and social partners

Employers shape both labour-market realities and educational choices. Recommendations include:

- 1 **Make inclusion measurable and resourced.** Move beyond symbolic actions by setting goals for recruitment, retention and progression of women in technical roles; allocate resources and leadership responsibility.
- 2 **Ensure safe and inclusive placements.** Prepare supervisors and teams to host girls and young women; define learning objectives; provide safe facilities and inclusive protective gear; implement zero-tolerance policies for harassment and sexist behaviour.
- 3 **Address task segregation and career progression.** Ensure women are not excluded from core technical tasks and fieldwork; provide transparent progression pathways and recognise technical competence fairly.
- 4 **Support work-life balance for all.** Implement flexible and predictable scheduling where possible, and ensure that caregiving policies do not penalise careers; normalise men's use of care-related leave to reduce gendered burdens.
- 5 **Partner with VET providers and communities.** Participate in mentoring networks, outreach activities and curriculum co-design; provide role models who reflect diversity of age, background and role type.
- 6 **Use behavioural insights in recruitment and communication.** Review job descriptions and recruitment channels for gendered language and bias; use inclusive imagery and norm-setting to widen applicant pools.

5.6 Suggested monitoring indicators

To support accountability and learning, stakeholders should adopt a common indicator framework. Indicators should be disaggregated by gender and, where possible, by intersectional dimensions (region, socio-economic status, migration background, disability). A non-exhaustive set is proposed below.



Domain	Indicator	Why it matters	Possible data source
Participation	Share of girls enrolled in energy/technical VET families (by programme and level)	Tracks access and segregation patterns	VET enrolment administrative data
Retention	Completion rates in energy/technical VET programmes (girls vs boys)	Identifies dropout points and programme barriers	VET completion data
Belonging and safety	Student-reported sense of belonging and experience of discrimination (survey)	Captures hidden curriculum and climate	Student surveys/focus groups
Transition	Share of students entering internships/apprenticeships in clean energy-related companies (girls vs boys)	Tracks access to work-based learning	Placement records
Employment outcomes	Share of graduates employed in clean energy-related roles 6–12 months after graduation	Measures pipeline into jobs	Graduate tracking surveys
Workplace inclusion	Incidents and reporting of harassment/discrimination during placements; resolution outcomes	Signals workplace readiness and safety	School/company reporting mechanisms
Institutional change	Number of VET centres with active equality plans and trained staff (gender-transformative pedagogy)	Measures capacity and sustainability	Institutional reporting

5.7 Research and data priorities

Finally, national reports show that several gaps limit evidence-based policymaking. Priorities for future research and data development include:

- **Better disaggregation of labour-market data for renewable-energy subsectors and green occupations**, including gender and intersectional dimensions.
- **Longitudinal tracking of VET students' transitions into employment and further education**, to identify critical exit points for girls.
- **Evaluation of mentoring and outreach interventions**, including which designs work for which groups of girls and in which contexts.
- **Research on workplace cultures in clean energy and related industries**, including effective organisational change strategies.
- **Participatory research** with girls and young women to ensure that interventions respond to lived realities and aspirations.

6. Conclusions

This Blueprint demonstrates that girls' participation in clean energy-related studies is shaped by a complex interplay of societal norms, educational practices and institutional structures. Across the national reports, barriers are remarkably consistent: **gender stereotypes, limited representation, biased guidance, segregated VET pathways, and workplace cultures that can be resistant to women's authority and presence.**

At the same time, the evidence shows that change is possible. Facilitating factors emerge when systems actively expand girls' horizons, build confidence through hands-on learning, institutionalise mentoring and peer support, and make workplaces safe and inclusive. Crucially, **facilitating factors are strongest when they move beyond isolated projects and become embedded in governance, funding, monitoring and everyday institutional practice.**

A European-oriented conclusion is clear: the clean energy transition is also a gender equality project. If Europe needs skills for the green transition, it must also dismantle the structural and cultural barriers that prevent half of the population from participating on equal terms. This requires **coordinated action across education, labour markets and energy policy—supported by data, accountability and stable resourcing.**

Finally, applying an intersectional and feminist approach changes what "success" looks like. The goal is not only to increase female numbers in technical pathways, but to **transform the cultures and structures that define who belongs, what competence looks like, and whose futures are considered possible.** By moving from inclusion as gatekeeping to openness and pluralism, and by building constellations of support rather than relying on exceptions, **the STAR Girls ecosystem can contribute to a more equitable and sustainable European energy future.**

The conclusions of this Blueprint highlight the strategic importance of promoting **open, plural, and diverse representations of women** working in the clean and renewable energy sector, in line with key European Union policy frameworks. The **European Green Deal (2019)** and its related initiatives emphasise that the green transition must be **socially just and inclusive**, ensuring that no group is left behind as Europe moves towards climate neutrality. Broadening and diversifying representations of women across clean energy professions directly supports this objective by widening access to emerging green jobs and skills.

In parallel, the **European Skills Agenda (2020)** calls for strengthening skills development to support both the green and digital transitions, explicitly highlighting the need to address skills shortages and mismatches. Challenging narrow, gendered representations of technical competence contributes to expanding the talent pool, increasing girls' participation in STEM and VET pathways, and ensuring that the clean energy sector can draw on the full diversity of available skills.

Finally, the **EU Gender Equality Strategy 2020–2025** underlines the importance of tackling **structural and cultural barriers** that limit women's full participation in education and the labour market, including horizontal and vertical segregation. Promoting diverse, realistic, and non-stereotypical representations of women in clean energy - across technical, operational, organisational, and community-based roles - supports this strategy by challenging gender norms, strengthening girls' sense of belonging, and fostering long-term systemic change.

Taken together, these policy frameworks confirm that plural representation is not merely a matter of visibility or communication, but a **policy-relevant mechanism** that connects gender equality, skills development, and the green transition, reinforcing the transformative ambition of European action towards a more inclusive and sustainable future.

The findings of this Blueprint are not intended to remain at the level of analysis, but to **actively shape and inform the forthcoming activities of the STAR Girls project.** The evidence gathered across countries provides

concrete guidance on *what should be embedded, how, and at which level* in the next phases of implementation.

First, the Blueprint confirms the need for future STAR Girls activities to prioritise **early, experiential, and confidence-building interventions**. As gendered expectations and self-selection mechanisms emerge well before formal educational choices, upcoming actions will integrate hands-on experiences, practical learning formats, and age-appropriate engagement that expose girls to clean-energy-related skills and environments at an early stage.

Second, the strong and recurring role of mentoring, visibility, and belonging identified in the Blueprint will be reflected in the design of **mentoring pathways and support ecosystems**. Rather than relying on isolated role models, future activities will emphasise sustained relationships, peer exchange, and interaction with women professionals in diverse clean energy roles, ensuring that mentoring reflects plurality rather than exceptionalism.

Third, insights on workplace culture, validation gaps, and school-to-work transitions will directly inform **pilot actions and collaboration with industry and territorial actors**. Planned activities will therefore pay particular attention to inclusive internships, apprenticeships, and work-based learning experiences, as well as to dialogue with employers on organisational culture, task allocation, and recognition of competences.

Fourth, the Blueprint's intersectional and critical-inclusivity perspective will be embedded across future activities, influencing not only *who* is targeted, but *how* actions are designed and evaluated. This includes awareness of socio-economic barriers, migration background, territorial inequalities, and accessibility, as well as a continuous effort to avoid gender-neutral approaches that risk reproducing exclusion.

Finally, the Blueprint reinforces the importance of **learning, reflexivity, and internal alignment within the consortium**. Future STAR Girls activities will build on the shared analytical framework developed through this document, supporting coherent implementation across partners and enabling feedback loops that allow the project to adapt and improve its actions over time.

In this sense, the Blueprint functions as a **living strategic reference** for STAR Girls: it translates research findings into practical orientation, ensuring that subsequent project activities are evidence-based, gender-transformative, and aligned with the broader ambition of a just and inclusive clean energy transition.

References

European-level references:

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Appendix A. Comparative matrix of key barriers and enablers (overview)

This appendix provides a high-level comparative overview. It summarises key patterns across countries and can be expanded into a more detailed matrix as additional national data become available.

Theme	Spain/Basque Country	Greece	Portugal	Netherlands	Italy
Societal stereotypes	Strong horizontal segregation; “pipeline paradox”; need early guidance and cultural change	Family expectations and stigma; very low participation in some specialisations	Social prejudice about women in engineering; male-coded operational culture	Stereotypes persist; need behaviour-aware approaches and cultural change	Persistent stereotypes; family expectations and socio-cultural norms strongly influence choices
Educational barriers	Low share of women in technical VET families; hidden curriculum; data limits on renewables subsectors	Near-zero female presence in some energy pathways; need stronger guidance and visibility	Need more practical technical subjects early; insufficient knowledge of pathways	Need gender-aware pedagogy; intersectional data gaps	Low female participation in STEM-oriented VET; gender-biased or gender-blind guidance; hidden curriculum discourages girls; limited early hands-on exposure.
Workplace culture	Transition points critical; need inclusive internships and mentoring with companies	Workplace entry barriers; need safe placements and supportive supervisors	Micro-sexism and task segregation reported; remote sites a barrier	Need structural funding and institutional accountability	Highly gender-segregated labour market; masculine organisational cultures; micro-sexism, lack of recognition, and higher performance expectations for women
Key enablers	Strong VET system and dual learning; institutionalise mentoring; integrate equality in governance	Mentoring and awareness; teacher engagement; showcasing diverse women professionals	Conditions for work-life balance; practical exposure; mentoring and inclusive recruitment	GEPS, monitoring, inclusive communication; deconstruct “neutrality”	Early hands-on exposure; relatable female role models; purpose-driven narratives; hybrid professional roles
Recommendations focus	Institutionalise mentoring; strengthen guidance; address intersectional inequalities; collaboration	Counter family stereotypes; strengthen VET pathways; inclusive environments and safe workplaces	Increase early technical exposure; targeted workplace inclusion measures; reduce geographic barriers	Embed equality in policy and funding; improve data; scale promising practices	Strengthen early gender-sensitive orientation; reform guidance systems; embed gender-transformative curricula; improve inclusive school-to-work transitions; address intersectional inequalities;

Appendix B. European-level sources consulted (selection)

The Blueprint complements national report evidence with a selection of European and international sources on gender gaps in STEM and in the energy transition. A short list is provided here to support transparency and further reading.

- European Commission – She Figures (latest edition available during drafting).
- European Commission – European Education Area: Gender equality in STEM education (Eurostat-based indicators).
- Eurostat – Science and technology statistics (women among scientists and engineers; women in science and technology).
- European Institute for Gender Equality (EIGE) – Gender Equality Index and thematic work on the green transition.
- International Renewable Energy Agency (IRENA) – Gender and renewables workforce reports.
- International Energy Agency (IEA) – gender and energy insights (leadership and workforce patterns).



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