



Project Result 2

Deliverable: A gender analysis of the Clean Energy Transition

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Executive Summary

The clean energy transition is crucial for addressing the pressing challenges of climate change, environmental degradation, and energy security. In this transition, the participation of women is of utmost importance. Women bring diverse perspectives, knowledge, and experiences that enrich decision-making processes which are valuable to arrive at effective comprehensive solutions. Using ecofeminism and intersectionality this report aims at overviewing an approach to assist the mainstreaming of gender into the clean energy transition in all sectors and at different levels.

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I Introduction

The Clean Energy Transition (CET) denotes a global shift from conventional, non-renewable energy sources toward sustainable and renewable alternatives like wind, solar, hydro, geothermal, and biomass energy. This transition stands as a pivotal mechanism to notably reduce carbon emissions, mitigate the acceleration of global temperatures, and alleviate the detrimental repercussions of climate change on ecosystems, communities, and economies. This transition necessitates multifaceted interventions encompassing policy alterations, technological advancements, and societal adaptations, including increased investments in renewable energy infrastructure, heightened energy efficiency, and alterations in consumption patterns.

Within the network of FemPower, the CET is defined as follows:

The framework and actions needed to help us move away from fossil fuels towards cleaner energy and reduce greenhouse emissions.

The imperativeness of transitioning to clean energy sources has never been more pronounced. Recent research indicates that nearly half of the planet's species are undergoing rapid population declines, leading some scientists to assert the advent of a human-driven "sixth mass extinction" event¹. The energy sector accounts for an overwhelming three-quarters of global emissions, thereby perpetuating climate change and serving as the primary cause of health-damaging air pollution, as well as, the overall deterioration of ecosystems². A global shift toward clean energy stands as a pivotal enabler for initiatives aimed at combating climate change and fostering sustainable economic and societal objectives.

Clean energy technologies offer sustainable, enduring solutions for electricity generation, heating, and transportation, without contributing to climate-altering emissions. Embracing cleaner energy alternatives promises the reduction of air pollution, respiratory diseases, and associated health risks. The transition toward renewable energy sources simultaneously facilitates the conservation of natural resources, safeguards biodiversity, and mitigates ecological degradation linked to fossil fuel extraction and consumption.

¹ Paddison, L. (2023, May 22). *Global loss of wildlife is "significantly more alarming" than previously thought, according to a new study.* CNN.

<https://edition.cnn.com/2023/05/22/world/wildlife-crisis-biodiversity-scn-climate-intl/index.html>

² *Greenhouse gas (GHG) emissions | climate watch.* Climate Watch. (n.d.).

<https://www.climatewatchdata.org/ghg-emissions>



Moreover, the clean energy transition augments energy security and resilience. Over-reliance on fossil fuels, particularly those acquired through international trade, creates geopolitical and economic vulnerabilities. Diversifying energy sources and endorsing decentralized renewable energy systems serve to mitigate dependence on volatile global energy markets, thus strengthening energy independence. Renewable energy resources, often locally abundant, afford greater energy security, notably benefiting nations with restricted fossil fuel reserves. The European Union (EU) has been at the forefront of this effort, committing to achieving climate neutrality by 2050 and ratifying the United Nations (UN) Paris Agreement of 2015³.

However, the attainment of these objectives necessitates everyone's participation and collaboration from all sectors of society.

1.1 Gender and Gender Equality in the context of this report

Within this report, the term gender will be used to refer to “a system of socially defined roles, privileges, attributes and relationship between men and women which are learned and not biologically determined.”⁴ The general terms “men” and “women” are employed for clarity and adherence to conventional terminology. However, it's essential to underscore that this choice does not signify the exclusion of other gender identities, nor does it imply uniform experiences, challenges, or discriminations among individuals falling within these delineated categories. Recognizing the diverse spectrum of human identities and experiences, we aim to navigate this discourse with profound sensitivity and utmost respect for the multifaceted nature of gender.

According to Lieu et. al. (2020) gender equality means “building more equitable gender relations that support the human rights, dignity and capabilities of all women and men,

³ *The Paris Agreement* . United Nation | Climate Change . (n.d).
<https://unfccc.int/process-and-meetings/the-paris-agreement>

⁴ Khamati-Njenga, B., & Clancy, J. (2003). *Concepts and issues in gender and Energy*. ResearchGate.
https://www.researchgate.net/publication/254860437_Concepts_and_issues_in_gender_and_energy



intersected by differences of class, race, sexuality, age, marital status, ability and circumstances” (pp. 2).⁵

1.2 Background Information

Energy stands as a pivotal cornerstone in the lives of both men and women, yet the specific requirements and capacities of individuals diverge across diverse societies. Nonetheless, prevailing energy policies often disregard gender differences, operating under the assumption of equal benefits for all genders. These “gender-blind”⁶ policies, failing to acknowledge gender dynamics, fall short in reshaping societal gender relations. The attainment of gender equality within the energy sector emerges not merely as a human rights imperative but also as a pivotal driver for societal, environmental, and economic advancement. Embedding these dimensions into energy policy formulation and implementation assumes heightened significance, as women, akin to men, serve as pivotal catalysts for innovative and inclusive solutions. Regrettably, empirical evidence underscores a constrained involvement of women within the energy domain, leading to the underutilization of a reservoir of talented individuals and a failure to uphold human rights commitments. Research findings assert that gender diversity and the active engagement of women within the energy sector are necessary for the successful transition towards clean energy⁷.

⁵] J. Lieu, A.H. Sorman, O.W. Johnson, L.D. Virla, B.P. Resurreccion, ‘ Three sides to every story: Gender perspectives in energy transition pathways in Canada, Kenya and Spain, *Energy Res. Social Sci.* 68 (2020) 101550, <https://doi.org/10.1016/j.erss.2020.101550>.

⁶ *Gender blindness is identified as a lack of awareness of gender inequalities, which can further perpetuate stereotypes and inequalities. This lack of gender awareness can benefit groups that are already in more privileged positions.*

⁷ Wiley, C., & Monllor-Tormos, M. (2018). Board Gender Diversity in the STEM&F Sectors: The Critical Mass Required to Drive Firm Performance. *Journal of Leadership & Organizational Studies*, 25(3), 290-308. <https://doi.org/10.1177/1548051817750535>

Phillips, K. W. (2014). How diversity works. *Scientific American* . Retrieved from https://www.scientificamerican.com/index.cfm/_api/render/file/?method=inline&fileID=9F4FCDB9-A5B3-40AB-A9A525FDC71156AB.

Jaffe, A. M., Carela, J. M., & Jelescu Dreyfus, M. S. (2020). *Future energy workforce: The role of corporate boards in Diversity and performance - center on global energy policy at Columbia University Sipa: CGEP*. Center on Global Energy Policy at Columbia University SIPA | CGEP. <https://www.energypolicy.columbia.edu/publications/future-energy-workforce-role-corporate-boards-diversity-and-performance>

Tam, C. (2018). *Gender diversity in energy sector is critical to clean energy transition – analysis*. IEA. <https://www.iea.org/commentaries/gender-diversity-in-energy-sector-is-critical-to-clean-energy-transition>



The commitment of world leaders in 2015 to the Sustainable Development Goals (SDGs) including Goal 5, which endeavors to “achieve gender equality and empower all women and girls by 2030.”⁸ Realizing this aspiration within the energy sphere entails the pursuit of equitable opportunities, pay, and leadership roles. Nonetheless, achieving gender equality within a little less than a decade demands substantial dedication from governments, industries, and other stakeholders in the energy sector. Implementing measures that accelerate the integration of women into the clean energy industry becomes paramount for expedited progress toward gender equality.

1.3 Purpose and Objectives of the Report

An examination of gender dynamics within the context of the clean energy transition holds the potential to pinpoint and redress gender disparities within the energy sector, ensuring equitable benefits for both men and women. This analysis serves as a catalyst for the development of gender-responsive policies and initiatives, fostering women’s inclusion in the renewable energy workforce and enhancing energy accessibility for women and marginalized communities.

Undertaking a gender analysis of the clean energy transition involves examining the distinct impacts of this transition on women and men, emphasizing the integration of gender considerations into policies, programs, and projects associated with this shift.

For instance, women and men may have different roles, necessities, and preferences concerning energy usage, accessibility, and management. The transition to clean energy could disproportionately affect women, worsening energy poverty and restricting their access to clean energy technologies and services, thereby detrimentally influencing their health, education, and livelihoods. On the other hand, women may possess unique expertise,

Beides, H., & Maier, E. (2022). *Getting more women into the Energy Sector: A Renew’ed approach for mena*. World Bank Blogs.

<https://blogs.worldbank.org/arabvoices/getting-more-women-energy-sector-renewed-approach-mena>

⁸ United Nations. (n.d.). *#ENVISION2030 Goal 5: Gender Equality | Division for Inclusive Social Development (DISD)*. United Nations.

<https://social.desa.un.org/issues/disability/envision-2030/envision2030-goal-5-gender-equality>



competencies, and viewpoints related to energy and the environment, potentially playing a key role in driving the clean energy transition forward.

Addressing these gender-specific considerations necessitates an approach that encapsulates the following key elements:

1. Integration of women's perspectives and needs into policies and programs governing the clean energy transition.
2. Mitigation of gender-based disparities in accessing clean energy technologies and services.
3. Promotion of women's involvement in decision-making processes linked to the transition.
4. Facilitation of women's entrepreneurial endeavors and employment opportunities within the clean energy sector.
5. Mitigation of gender-based violence and other safety concerns associated with the transition process.

This comprehensive gender analysis serves as an essential tool in ensuring an inclusive and equal clean energy transition, acknowledging and addressing the multifaceted gender dimensions elaborately linked into this transformative process.

1.4 The Significance of Integrating a Gender Analysis

The pivotal role of women within the sphere of the clean energy transition necessitates the initiation of a gender analysis. This analytical process serves as an initial step in identifying the differences between and among women and men regarding their societal standings, resource allocations, opportunities, constraints, and power dynamics within our contextual framework. It enables the formulation of targeted interventions to rectify gender disparities and meet the distinct needs of women and men. Ensuring the active engagement of women across all levels, we can maximize the positive impacts of the clean energy transition, while fostering a more inclusive, sustainable, and resilient future for all.



Historically, women have been underrepresented and marginalized in the energy sector⁹. Their inclusion not only tackles gender inequalities but also extends access to sustainable livelihoods, economic prospects, and leadership roles. This leads to economic, social, and political empowerment for women, strengthening their overall well-being and advancing the cause of gender equality.

Women significantly contribute diverse perspectives and specialized expertise to the clean energy sector. They often have unique insights into energy needs, preferences, and challenges within households, communities, and sectors such as agriculture and health. Engaging women in decision-making processes, harnesses their knowledge and experiences, leading to more comprehensive and efficacious energy solutions. Their inclusion enriches the conception, execution, and assessment of clean energy initiatives, rendering them more inclusive, relevant, and responsive to the multifaceted needs of all genders.

Moreover, women serve as catalysts for social and behavioral transformation. As primary energy users and managers in numerous households¹⁰, their involvement in the clean energy transition accelerates the adoption of sustainable practices and technologies. They wield influence over energy consumption patterns, advocating for energy efficiency and endorsing renewable energy solutions at grassroots levels¹¹. Women's leadership and impact within their familial and communal spheres create a ripple effect, inspiring others to embrace clean energy practices and contribute to sustainable development.

⁹ Clancy, J. & Feenstra, M. (2019) *Women, Gender Equality and the Energy Transition in the EU*. Retrieve from EuropeanThinkTank website: [https://www.europarl.europa.eu/thinktank/en/document/IPOL_STU\(2019\)608867](https://www.europarl.europa.eu/thinktank/en/document/IPOL_STU(2019)608867)
IEA (2022). *Understanding Gender Gaps in Wages, Employment and Career Trajectories in the Energy Sector*. Retrieved from: <https://www.iea.org/data-and-statistics/data-tools/gender-and-energy-data-explorer>

¹⁰ Milne, W. (2003) Women, Energy and Sustainability: Making Links, Taking Action. *Women's Concerns*, 23, 55–60.

Shrestha, B., Tiwari, S. R., Bajracharya, S. B., Keitsch, M. M., & Rijal, H. B. (2021). Review on the importance of gender perspective in household energy-saving behavior and energy transition for Sustainability. *Energies*, 14(22), 7571. <https://doi.org/10.3390/en14227571>

¹¹ Gukhool, T. (2021). Gendered Voices. *United Nations Development Programme*, (2). Retrieved from: <https://www.undp.org/sites/g/files/zskgke326/files/migration/mu/GV-02---Green-Energy--web.pdf>



I.5 The Utilization of Frameworks

I.5.1 Ecofeminism

Ecofeminism emerged in the 1970s as a political movement, pioneered by Françoise d'Eaubonne, who coined the term "ecological feminism" in 1972. She contended that the planet's degradation stemmed from the profit-driven nature inherent in male power. In her 1974 book "Feminism or Death," d'Eaubonne officially introduced the term "ecofeminism," symbolizing women's potential to lead an ecological revolution for human survival on Earth¹². Her vision painted a future where the planet would flourish once more, transcending gender categorizations to prioritize humanity. This envisioned world required redefined relationships between men, women, and nature. Since then, ecofeminists have diligently highlighted the interconnectedness between the subjugation of women, marginalized groups, and the environment, aiming to address these linkages¹³. Rosemary Radford argued in 1975 that true liberation for women and a solution to the ecological crisis cannot be achieved within a society based on domination as its fundamental mode of operation¹⁴.

Ecofeminism explores the Self-Other dynamic, critiquing the dominance of the "self" over the "other" and challenging binary categorizations inherent in Western philosophy, colonialism, and patriarchy. Ecofeminism contends that the climate crisis and marginalization of certain groups intertwine, demanding interconnected solutions.

Focusing on marginalized groups, ecofeminism underscores the impact of environmental policies on vulnerable populations, addressing contemporary issues such as toxic production and unfair trade¹⁵. It presents a novel political and economic vision, highlighting the

¹² Nhanenge, J. (2011) *Ecofeminism : Towards Integrating the Concerns of Women, Poor People, and Nature into Development*. UPA.

¹³ Adams, C. J. (1993). *Ecofeminism and the Sacred*. New York: Continuum.

Merchant, C. (1990). Ecofeminism and Feminist Theory. In I. Diamond and G. Orenstein (Eds.) *Reweaving the World: The Emergence of Ecofeminism*, San Francisco: Sierra Club Books.

Warren, K. J. (2000). *Ecofeminist Philosophy: A Western Perspective on What It Is and Why It Matters*. Lanham: Rowman and Littlefield.

¹⁴ Radford, R. R. (1975). *New Woman, New Earth: Sexist Ideologies and Human Liberation*. Seabury Press

¹⁵ Nhanenge, J. (2011) *Ecofeminism : Towards Integrating the Concerns of Women, Poor People, and Nature into Development*. UPA.



undervaluation of both women and nature within current economic systems¹⁶. Additionally, ecofeminism examines the roles of masculinity and femininity within the environmental movement. "Toxic masculinity" reflects detrimental aspects of masculine ideals rooted in violent systems of oppression like patriarchy, exemplified in the concept of "petro-masculinity", associating petrochemical usage with historical patriarchal dominance¹⁷.

Addressing such inequalities requires a shift toward an intersectional understanding within ecofeminism. The movement's evolution demands an inclusive approach that avoids the romanticization of women's relationship with nature and acknowledges the limitations of prior feminist movements that predominantly centered on cisgender, heterosexual, white women. Embracing intersectionality is paramount for ecofeminism to achieve efficacy.

1.5.2 Intersectionality

Intersectionality, as understood by the European Union (EU) today, is a "*tool for studying, understanding and responding to the ways in which sex and gender intersect with other personal characteristics/identities, and how these intersections contribute to unique experiences of discrimination*" (EIGE)¹⁸. An individual's chances and encounters with discrimination are shaped by the intersection of various social categories operating across multiple levels simultaneously. Everyone faces both privilege and discrimination ingrained within established systems of oppression like patriarchy, capitalism, racism, and colonialism, among the most prevalent ones¹⁹.

Kimberlé Crenshaw's influential work shaped this concept²⁰. She developed this legal framework to address the exclusion of Black, Indigenous, and People of Color (BiPoC) women from the voices of white feminists. Over time, however, the concept of

¹⁶ Mellor, M. (2017) Ecofeminist Political Economy: A green and feminist agenda. In S. MacGregor (Eds.) *Routledge Handbook of Gender and Environment*. Oxon: Routledge.

¹⁷ Daggett, C. (2018) Petro-masculinity: Fossil Fuels and Authoritarian Desire. *Millennium: Journal of International Studies*, Vol. 47, no. 1.

¹⁸ EIGE (n.d.) *Intersectionality*. Retrieved from:

<https://eige.europa.eu/publications-resources/thesaurus/terms/1050>

¹⁹ CIJ/ENAR (2019) *Intersectional discrimination in Europe: relevance, challenges and ways forward*. Brussels: European Network Against Racism, 7. Retrieved from:

https://www.intersectionalityjustice.org/img/intersectionality-report-FINAL_yizq4j.pdf

²⁰ For more information on intersectionality and its importance you can watch this TED Talk by Kimberlé Crenshaw <https://www.youtube.com/watch?v=akOe5-UsQ2o> that gives an overview of the term and why it is important.



intersectionality has been incorporated into mainstream feminism, leading to a partial dilution of its original focus on race and power²¹.

In this report, we aim to employ the concept of intersectionality to identify institutional and systemic discrimination and exclusion across all grounds, offering a pathway toward genuine transformation that extends beyond the European Green Deal's objective of reshaping the EU's economy for sustainability. For instance, when examining energy poverty in Europe, we acknowledge gender disparities among those facing insufficient access to essential energy services. However, we recognize that gender is not the sole pertinent factor; intersectionality allows us to explore beyond this single dimension of inequality. Socioeconomic status and/or race equally influence whether an individual experiences energy poverty. To delve into the root causes of energy poverty and devise targeted interventions, comprehensive data and information accounting for intersectionality, including gender and race, are crucial²².

1.5.3 Gender Mainstreaming

Internationally acclaimed as a strategy for achieving gender equality, gender mainstreaming *“involves the integration of a gender perspective into the preparation, design, implementation, monitoring, and evaluation of policies, regulatory measures, and spending programs, to promote equality between women and men, and combating discrimination.”*²³

This approach enhances the quality and societal relevance of policymaking and legislative efforts, ensuring they effectively address the diverse needs of society.

Beyond merely avoiding the creation or reinforcement of disparities, gender mainstreaming involves a thorough analysis of existing inequalities. It requires the development of policies aimed at rectifying imbalances and dismantling the underlying mechanisms that perpetuate these inequalities²⁴.

Implementing gender mainstreaming requires a comprehensive approach that integrates gender perspectives into policy content and ensures gender representation throughout the

²¹ EEB & WECF (2021) Report: *Why the European Green Deal Needs Ecofeminism*. Retrieved from: <https://eeb.org/library/why-the-european-green-deal-needs-ecofeminism/>

²² Ibid.

²³ EIGE (2017) *What is Gender Mainstreaming?* (p. 5) Retrieved from:

<https://eige.europa.eu/publications-resources/publications/what-gender-mainstreaming>

²⁴ Ibid.



policymaking process²⁵. This dual strategy not only enhances policy effectiveness but also contributes to reducing existing inequalities that impact individuals of all genders.

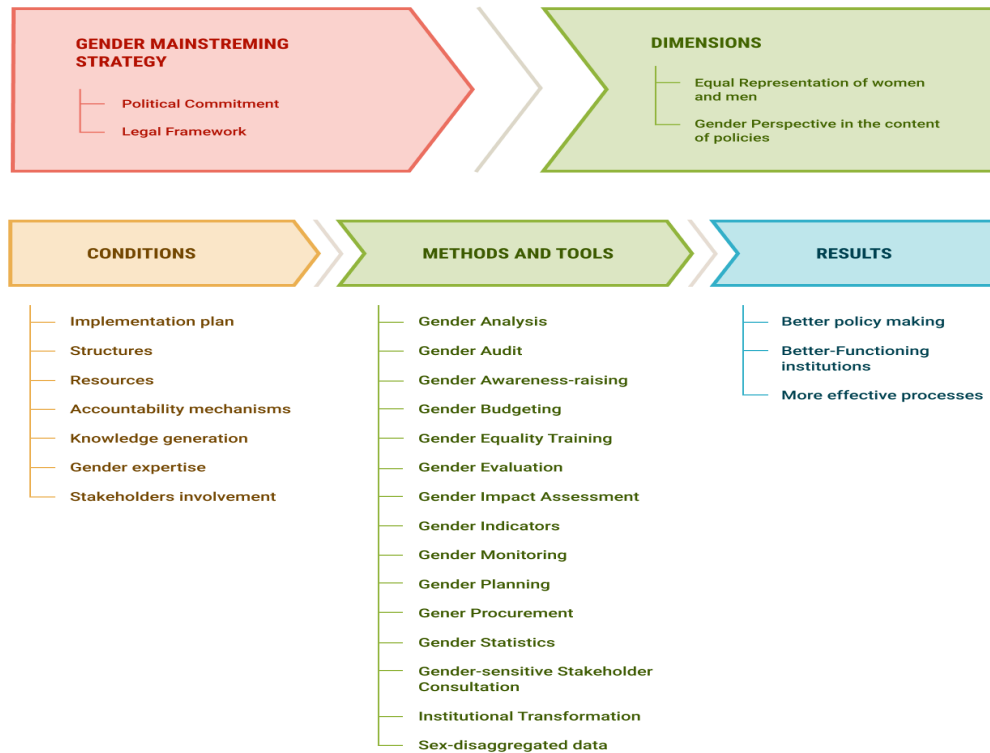


Figure 1 Overview of the different components of gender mainstreaming.

Source: [EIGE](#)

2 Unveiling Gender Dimensions: EU Energy Transition and Equality Objectives

In the wake of escalating climate concerns, the Clean Energy transition (CET) has emerged as a pivotal global endeavor, steering us away from fossil fuel dependency towards sustainable energy sources like wind, solar, hydro, geothermal, and biomass. This shift embodies a multifaceted initiative aimed at curbing carbon emissions, countering climate change, and establishing an accessible, dependable energy framework with minimal environmental impact.

²⁵ Ibid.



FemPower defines the CET as the comprehensive framework and actions essential for disengaging from fossil fuels, embracing cleaner energy alternatives, and reducing greenhouse gas emissions. As our world grapples with the ramifications of climate change exacerbated by current energy practices, the urgency for this transition becomes increasingly evident. The EU has taken a pioneering role in this movement, steadfast in its commitment to achieving climate neutrality by 2050 and aligning with the United Nations' Paris Agreement (2015)²⁶.

2.1 CET EU Policy Papers

The EU's energy policies are designed to fulfill the Paris Agreement commitments by transitioning to cleaner energy sources and enhancing efficiency, aiming for a more sustainable, competitive, and secure energy system. This shift seeks to reduce reliance on fossil fuels, aiming for climate neutrality by cutting greenhouse gas emissions. Through legislative acts like the Clean Energy for all Europeans, the EU places citizens at the core of this transition.

2.1.1 European Green Deal

The European Green Deal is a comprehensive policy framework proposed by the European Commission in December 2019 to make Europe the world's first climate-neutral continent by 2050. The Green Deal is a roadmap for transforming the EU's economy and society towards sustainability and reducing greenhouse gas emissions.

Here are some key elements of the European Green Deal:

1. **Climate neutrality:** The Green Deal aims to make Europe climate-neutral by 2050, which means that the EU will not contribute to global warming beyond what can be absorbed by natural carbon sinks, such as forests and oceans.
2. **Net-zero emissions:** The Green Deal proposes to reduce the EU's greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels, and to achieve net-zero emissions by 2050.

²⁶ For more information on the Paris Agreement visit the United Nations Climate Change page at: <https://unfccc.int/process-and-meetings/the-paris-agreement>



3. Sustainable energy transition: The Green Deal aims to accelerate the transition to clean and sustainable energy, including renewable energy, energy efficiency, and sustainable mobility.
4. Circular economy: The Green Deal aims to transform the EU's economy into a circular one, where waste is minimized, resources are conserved, and products are designed for reuse and recycling.
5. Just transition: The Green Deal emphasizes the need for a just transition, ensuring that the benefits and costs of the transition are distributed fairly across society and that no one is left behind.
6. Biodiversity: The Green Deal aims to protect and restore biodiversity, including through the restoration of degraded ecosystems and the adoption of sustainable agricultural practices.
7. Farm-to-fork strategy: The Green Deal proposes a new food policy framework, the Farm-to-Fork strategy, which aims to ensure a fair, healthy, and environmentally friendly food system.

The European Green Deal is a bold and ambitious plan to transform the EU's economy and society towards sustainability and address the challenges of climate change and biodiversity loss. The Green Deal is expected to drive significant investments in clean energy, sustainable infrastructure, and innovation, creating new opportunities for growth and jobs while reducing Europe's environmental footprint.

2.1.2 Clean Energy for All European Package

The Clean Energy Package is a comprehensive set of legislative proposals and measures that aim to accelerate the transition to a cleaner and more sustainable energy system in the European Union (EU). The package was adopted in 2019 and includes eight legislative proposals that address different aspects of the energy system, from renewable energy and energy efficiency to market design and governance.

The main goals of the Clean Energy Package are to increase the share of renewable energy in the EU's energy mix, improve energy efficiency, and ensure a more integrated and market-based energy system. The package includes several key measures, including:

- Renewable Energy Directive (RED II): This directive sets binding national targets for the share of renewable energy in the EU's final energy consumption, to achieve at



least 32% renewables by 2030. It also introduces new provisions to support the deployment of renewable energy, such as simplified administrative procedures and guarantees of origin.

- **Energy Efficiency Directive (EED):** This directive sets binding national targets for improving energy efficiency by 32.5% by 2030 and establishes a framework for promoting energy efficiency in buildings, industry, and transport.
- **Governance of the Energy Union Regulation:** This regulation establishes a framework for integrated national energy and climate plans, which ensure a coordinated approach towards the EU's energy and climate goals.
- **Electricity Market Regulation:** This regulation aims to create a more competitive and market-based electricity system, with increased cross-border trade and more flexibility to integrate renewable energy.
- **Energy Performance of Buildings Directive (EPBD):** This directive sets new requirements for the energy performance of buildings and aims to promote the renovation of existing buildings to improve energy efficiency.
- **Market Design Regulation:** This regulation introduces new rules to improve the functioning of the electricity market, such as new provisions for demand response, capacity mechanisms, and regional cooperation.
- **Regulation on Risk Preparedness in the Electricity Sector:** This regulation aims to improve the preparedness and response to electricity supply disruptions and ensure a more resilient electricity system.
- **Renewable Energy Financing Mechanism (REFM):** This mechanism aims to mobilize private investment in renewable energy by providing a framework for the voluntary purchase of renewable energy certificates by private investors.

Overall, the Clean Energy Package is a key part of the EU's efforts to achieve a sustainable and low-carbon energy system and promote the transition towards a more competitive, flexible, and integrated energy market.



2.1.3 REPowerEU Plan

REPowerEU is an EU plan adopted in 2022 in response to the hardships and global energy market disruption caused by Russia's invasion of Ukraine aiming to save energy, produce clean energy, and diversify EU's energy supplies.

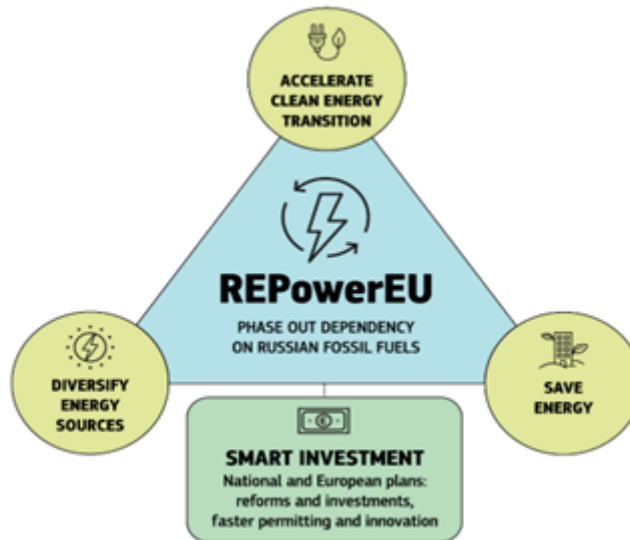


Figure 2 REPowerEU main targets

This initiative is expected to have a positive impact on the EU's emissions reduction progress over the next decade. However, the fast phasing out of fossil fuel imports from Russia will affect the transition trajectory compared to that under previous assumptions.

2.2 Gender Considerations in EU CET Policy Papers: Unveiling the Blind Spots

Ensuring equality, inclusivity, and fairness throughout the EU is a pivotal focus. The EU's core principle involves gender equality, safeguarded within the Treaty on the Functioning of the European Union (TFEU)²⁷, marking it as a primary EU goal. Article 8 of the TFEU explicitly outlines the Union's commitment to eliminating disparities and advancing equality between

²⁷ Official Journal of the European Union (2012) *Consolidated Version of the Treaty on the Functioning of the European Union*. C 326/47. Available at:

<https://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:12012E/TXT:en:PDF>



men and women across its operations. Achieving equality, sustainability, and security stands as integral facets of a comprehensive energy policy, crafted in a manner that's impartial to gender.

Echoing this sentiment, the EU Green Deal²⁸, the present cornerstone of Europe's growth strategy, spotlights climate neutrality and advocates for an equitable shift. It emphasizes the necessity for an inclusive and just transition, emphasizing that the transition's success hinges on fairness, inclusivity, and justice, emphasizing the need to engage diverse citizens and ensure no one is left behind.

Nevertheless, examinations assessing the potential impact of EU Green Deal policies on women in the energy sector, such as the recent study by Friedrich-Ebert-Stiftung in collaboration with the European Environmental Bureau (EEB) and WECF²⁹, raise concerns. They critique the EU Green Deal for not fully meeting its commitments to create a Union characterized by equality, suggesting it largely overlooks gender considerations. The absence of gender references, within the critical documents presented above, illustrates what Mang-Benza (2020)³⁰ termed as "gender blindness." This overlooks the crucial perspectives and contributions of women within the energy sector, perpetuating biases favoring male viewpoints. Consequently, women find themselves at the periphery of decision-making in renewable energy value chains, exacerbating gender inequalities. A notable example within the EU, seen in a German Local Energy Community (LEC), highlights persistent gender wealth gaps and cultural influences marginalizing women³¹.

Gender mainstreaming, as previously highlighted, is a critical practice which entails evaluating planned policies to ensure gender equality and women's empowerment. Despite its importance, it remains underexplored within the EU's CET. The scarcity of studies focusing on gender within CET, as highlighted by Paula Carroll's (2022)³² literature review, reveals a significant gap in understanding and integrating gender perspectives.

²⁸ Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, (2019). *The European Green Deal* (COM/2019/640 final). European Union. URL:

<https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52019DC0640&from=EN>

²⁹ Friedrich-Ebert-Stiftung, European Environmental Bureau & WECF (2022). *A Feminist European Green Deal: Towards an Ecological and Gender Just Transition*. Retrieved from:

<https://eeb.org/library/a-feminist-european-green-deal-towards-an-ecological-and-gender-just-transition/>

³⁰ Mang-Benza, C. (2020). Many shades of pink in the energy transition: Seeing women in energy extraction, production, distribution, and consumption. *Energy Res. Soc. Sci.* 73, 101901.

³¹ Ibid.

³² Carroll, P. (2022). Gender Mainstreaming the European Union Energy Transition. *Energies*, 15, 8087. <https://doi.org/10.3390/en15218087>



2.2.1 EU Gender Equality Strategy and Clean Energy Alignment

A crucial document that links the European Green Deal with gender equality, the EU Gender Equality Strategy 2020-2025³³ acknowledges that the primary challenges facing the EU today, such as the green and digital transitions and demographic shifts, all have gender-specific aspects. It acknowledges disparities like fewer opportunities for women as climate refugees, increased instances of energy poverty among women, and the differentiated impact of emission-free transport policies on women. Additionally, it highlights the significant role, especially that of young women, in driving climate action. The strategy further states the commitment of the European Commission to incorporate a gender perspective into all major Commission initiatives during the current mandate, including those falling under the European Green Deal.

Despite recognizing that certain Green Deal policies might differentially impact men and women, this acknowledgment isn't substantially integrated into the core Clean Energy and Green Deal directives. Specifically, the Green Deal does not make any explicit reference to gender or sex. It sets a target of “no person and no place left behind”, referring to EU vulnerable citizens and households, however, the lack of a commonly accepted or widely agreed legal definition of vulnerable persons raises concerns that initiatives targeting vulnerable citizens may not effectively address gender equality. Although the European Parliament's resolution of 15 January 2020 on the European Green Deal³⁴, underscores the importance of gender equality in achieving sustainability and a climate-neutral economy, explicit references to gender within the Clean Energy for All European Package and the REPowerEU plan remain absent.

2.2.2 Challenges and Considerations in Achieving Socially Just Climate Transitions in the EU

³³ European Union (2020). *The Gender Equality Strategy 2020-2025*. Retrieved from: <https://ec.europa.eu/newsroom/just/items/682425/en#:~:text=The%20key%20objectives%20are%20ending,gender%20balance%20in%20decision%2Dmaking>

³⁴ European Parliament (2020). The European Green Deal. Retrieved from: https://www.europarl.europa.eu/doceo/document/TA-9-2020-0005_EN.html



The European Green Deal underscores the imperative for unified EU strategies to propel a sustainable future, highlighting the unequal impacts of climate change. Through the Sustainable Europe Investment Plan, the Commission initiated the Just Transition Mechanism (JTM), specifically aiding regions reliant on carbon-intensive industries. While the JTM targets these areas, many disadvantaged groups across the EU bear a disproportionate burden from climate change and green transition efforts³⁵. Simultaneously, the 2021 EU Adaptation Strategy recognizes varied vulnerabilities among socioeconomic groups, exacerbating inequalities. It advocates for 'just resilience,' aiming to alleviate the unequal burden of climate risk and ensure fairness in the distribution of adaptation benefits (and burdens)³⁶.

However, in the pursuit of a 'just transition', concerns have been raised regarding potential negative social impacts, especially for vulnerable households. The extension of the Emissions Trading System (ETS II)³⁷ could substantially raise gas-fuelled domestic heating costs by up to 30% in 2030, particularly impacting low-income households, including those led by women, single parents, and older women³⁸.

To address these impacts, the European Commission proposes the creation of a Social Climate Fund (SCF), primarily financed by ETS revenue and Member State contributions, to financially assist the most disadvantaged groups. The SCF Regulation highlights the disproportionate impact of energy and transport poverty on women due to their lower incomes and their representation in 85% of single-parent families³⁹. Additionally, it emphasizes the importance of prioritizing gender equality, equal opportunities for everyone, including integrating these goals, and ensuring accessibility for individuals with disabilities throughout the SCF's implementation. Despite this initiative, critiques question the fund's adequacy in safeguarding vulnerable groups and promote green investments simultaneously. Gender considerations are also highlighted, acknowledging that women face higher

³⁵ European Institute for Gender Equality (2023) *Gender Equality Index 2023: Towards a green transition in transport and energy*. Retrieved from:

<https://eige.europa.eu/publications-resources/publications/gender-equality-index-2023-towards-green-transition-transport-and-energy>

³⁶ Ibid.

³⁷ As presented in the Gender Equality Index (2023): *The EU Emissions Trading System (ETS) is the cornerstone of achieving the EU's climate ambition and its key tool for reducing emissions of greenhouse gases (GHG). In operation since 2005, it is the world's first – and remains its largest – carbon market. It covers about 40 % of the EU's GHG emissions and about 5 % of global GHG emissions. The EU ETS functions as a 'cap and trade' system, with caps set for the total amount of certain GHGs that can be emitted by operators covered by the system. To reduce emissions, this cap will be reduced over time. The EU's target of reducing net GHG by at least 55% by 2030, strengthens the ETS, including on aviation, and extends it to new sectors, including maritime transport as of 2024. It also allows for setting-up a second ETS for buildings, road transport and fuel combustion in industries not covered by the existing ETS (ETS II).*

³⁸ Ibid.

³⁹ Ibid.



incidences of energy poverty, there are calls for the SCF allocations to adhere to gender-sensitive budgeting principles to effectively compensate and support these groups⁴⁰.

In conjunction, the Revised Renewable Energy Directive (2018/2001/EU)⁴¹ urges Member States to integrate human rights and gender equality into national energy and climate plans. However, analysis⁴² reveals that of the 27 National Energy and Climate Plans (NECPs) only eight reference gender, primarily within the preambular section, indicating a lack of substantive integration.

While the European Green Deal aims for a 'just' and 'socially fair' transition, the concepts of 'climate justice' and 'gender justice' within its framework are limited. Amid the EU's transition to a sustainable energy landscape, integrating gender perspectives emerges as crucial yet overlooked. Bridging this gap mandates deliberate efforts to embed gender considerations in all clean energy policies, ensuring equitable participation for all genders. This integration of gender considerations across clean energy policies becomes pivotal in achieving a socially just climate transition in the EU, necessitating comprehensive and inclusive approaches.

3 Women in the Clean Energy Sector

3.1 Energy Access Through a Gender Lens

The European Union boasts a high energy access rate of 100%, suggesting that all EU citizens have equal energy access, with no gender-based disparities. However, it's a mistake to equate mere availability with genuine access. While it may seem on paper that all EU citizens technically have access to energy and electricity services (with 100% connectivity), the reality

⁴⁰ Ibid.

⁴¹ European Parliament & Council of the European Union (2018). Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources. Retrieved from : https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.328.01.0082.01.ENG&toc=OJ:L:2018:328:TOC

⁴² Carroll (2022). Gender Mainstreaming the European Union Energy Transition.



is that the experience of energy access is not uniform across the EU. When we consider affordability alongside availability, disparities in access become evident.

The recent substantial surge in energy prices across Europe has forced many households to reassess their energy usage to manage their energy bills. In response, the European Commission (EC) has implemented a strategy aimed at curbing overall gas demand. This approach involves promoting alternative fuels and crucial tactics that directly impact EU residents, such as actively encouraging reduced consumption and minimizing heating and cooling in both public and private buildings⁴³. This energy crisis is anticipated to exacerbate energy poverty for a significant portion of EU households⁴⁴.

Given the complexities of energy poverty and the absence of a universally accepted definition, the EU faces uncertainties in accurately estimating its prevalence. Article 2(49) of the proposed Energy Efficiency Directive (EED)⁴⁵ defines energy poverty as “*a household’s lack of access to essential energy services that underpin a decent standard of living and health, including adequate warmth, cooling, lighting, and energy to power appliances, in the relevant national context, existing social policy and other relevant policies*”. As per the Energy Poverty Observatory, energy poverty arises when energy bills constitute a substantial proportion of consumers’ income, impacting their ability to meet other financial obligations, or when consumers are compelled to cut down on their household energy consumption. Besides elevated energy costs, frequently cited factors contributing to energy poverty include low income, significant expenditure of disposable income on energy, and inadequate energy efficiency in buildings⁴⁶.

⁴³ European Commission (EC) (2023). EU action to address the energy crisis. Retrieved from: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/eu-action-address-energy-crisis_en#reducing-demand

⁴⁴ Clancy, J., Kustova, I., Elkerbout, M. & Michael, K. (2022). The Gender Dimension and Impact of the Fit for 55 Package. European Parliament. Retrieved from: [https://www.europarl.europa.eu/RegData/etudes/STUD/2022/736899/IPOL_STU\(2022\)736899_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2022/736899/IPOL_STU(2022)736899_EN.pdf)

⁴⁵ European Parliament & Council of the European Union (2021). Proposal for a Directive of the European Parliament and of the Council on energy efficiency (recast), COM/2021/558 final. Retrieved from: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0558>

⁴⁶ Galvin, R., & Sunikka-Blank, M. (2018). Economic Inequality and Household Energy Consumption in High-income Countries: A Challenge for Social Science Based Energy Research. *Ecological Economics*, 153, 78-88. doi:10.1016/j.ecolecon.2018.07.003

Koukouvikis, G. & Uihlein, A. (2022). Energy poverty, transport poverty and living conditions - An analysis of EU data and socioeconomic indicators (EUR 31000 EN, JRC128084) Luxembourg: Publications Office of the European Union. ISBN 978-92-76-48396-0, doi:10.2760/198712

Recalde, M., Peralta, A., Oliveras, L., Tirado-Herrero, S., Borrell, C., Palència, L. & Mari-Dell’Olmo, M. (2019). Structural energy poverty vulnerability and excess winter mortality in the European Union: Exploring the



Because of the complexity of energy poverty, various indicators measure this phenomenon, leading to vastly different estimates. In EIGE's latest Gender Equality Index, the most broadly used indicators identified are "the share of the population i) not able to afford to keep their home adequately warm, ii) in arrears on their utility bills, or iii) living in dwellings with leaks, damp or rot."⁴⁷ In 2020, approximately 36 million EU citizens couldn't afford adequate warmth in their homes⁴⁸, yet the broader population affected by energy poverty likely exceeded 50 million⁴⁹.

The COVID-19 pandemic and escalating energy prices due to Russia's war in Ukraine have exacerbated these concerns. Specific groups, such as lone parents and older women, bear the effect of energy poverty due to intersecting economic and social inequalities. Women, consistently affected by lower incomes, are more vulnerable, leading to compromised living conditions and inadequate energy access⁵⁰. Likewise, energy poverty has the potential to strengthen and prolong these existing inequalities by contributing to income disparity, social exclusion, and influencing both health and well-being⁵¹.

Based on data from 2021, 7% of the overall population in the EU faces challenges in affording sufficient heating for their homes. Individuals such as lone parents, those with disabilities, those born outside the EU, and individuals with low educational backgrounds are most prone to difficulties in adequately heating their homes. In cases where a gender disparity exists, women consistently bear a higher impact of energy poverty (12%). For instance, 10% of single women and 9% of single men struggle to keep their homes adequately warm. Among

association between structural determinants and health. *Energy policy*, 133, 110869.

doi:10.1016/j.enpol.2019.07.005

⁴⁷ EIGE (2023) Gender Equality Index, p. 89.

⁴⁸ Eurostat (2021). Retrieved from:

<https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20211105-1>

⁴⁹ Thomson, H., & Bouzarovski, S. (2018). *Addressing Energy Poverty in the European Union: State of Play and Action*. Retrieved from: https://energy-poverty.ec.europa.eu/system/files/2022-04/paneureport2018_updated2019.pdf

⁵⁰ Simcock, N., Jenkins, K. E. H., Lacey-Barnacle, M., Martiskainen, M., Mattioli, G., & Hopkins, D. (2021). Identifying double energy vulnerability: A systematic and narrative review of groups at-risk of energy and transport poverty in the global north. *Energy Research & Social Science*, 82, 102351. doi:10.1016/j.erss.2021.102351

⁵¹ EU Energy Poverty Observatory (2020). *The multiple impacts of energy poverty, and the multiple benefits of addressing it*. Retrieved from:

https://energy-poverty.ec.europa.eu/discover/practices-and-policies-toolkit/publications/epov-multiple-impacts-energy-poverty-and-benefits-addressing-it_en



individuals aged over 65, 8% of women and 6% of men face difficulties in maintaining adequate warmth in their homes (Figure 3)⁵².

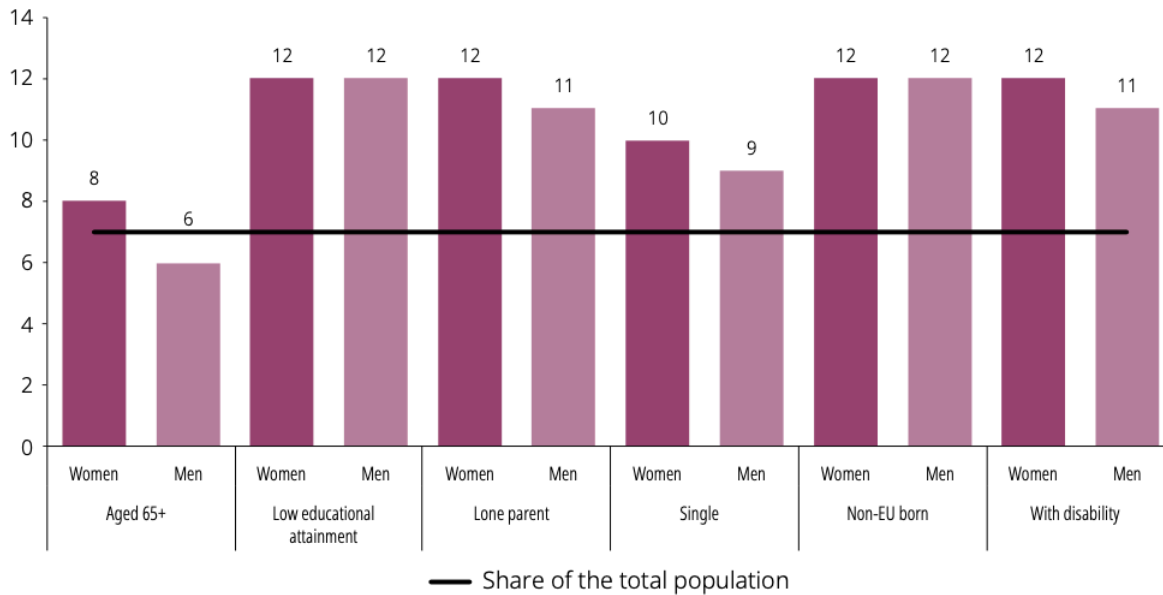


Figure 3 Inability to keep the home adequately warm, by sex and other social factors (% EU, 2021). Taken by EIGE (2023) Gender Equality Index.

Moreover, high energy costs have implications for households' financial stability, with about 6% of the EU population facing arrears on utility bills in 2021. Taking into account additional intersecting inequalities, certain groups were more prone to accumulating arrears on energy bills. Single mothers and certain disadvantaged groups, such as low-educated non-EU-born individuals, are at heightened risk of bill arrears (Figure 4)⁵³.

⁵² EIGE (2023) Gender Equality Index, pp. 90.

⁵³ EIGE (2023) Gender Equality Index pp. 91

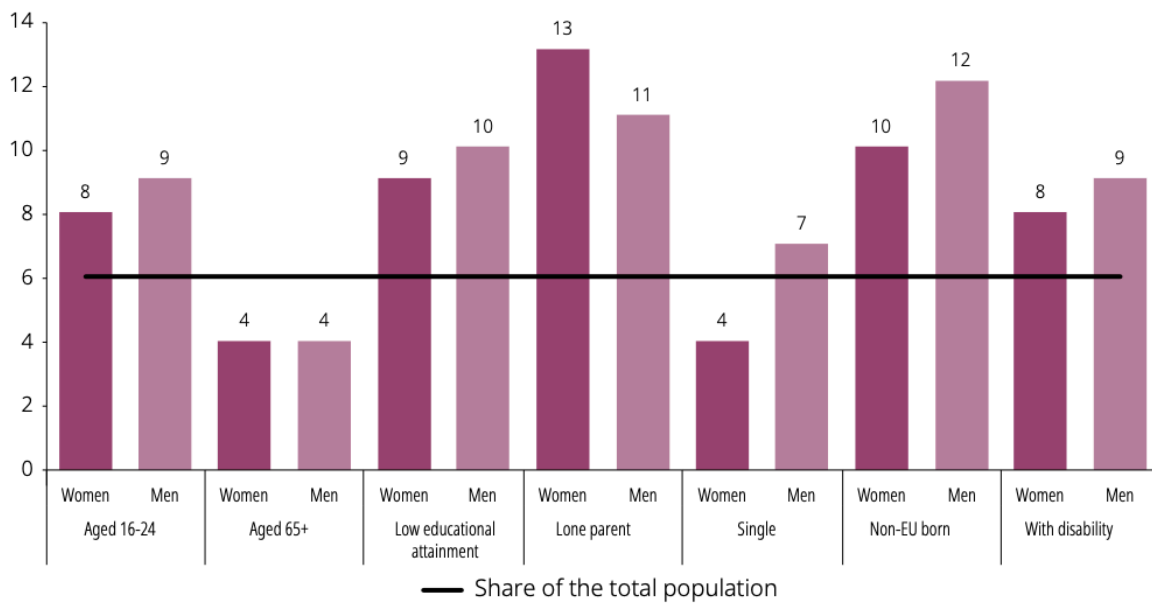


Figure 4 Share of people with arrears on utility bills, by sex and other social factors (% , EU, 2021).

Taken by EIGE (2023) Gender Equality Index.

Small businesses, notably those owned or employing women, are also under threat due to rising energy prices, lacking adequate consumer protection measures⁵⁴. Recent data from Eurofound depicts an even bleaker scenario, with a considerable rise in respondents facing arrears or anticipating difficulties paying utility bills. Lone parents, especially lone mothers, anticipate severe challenges in meeting their bills⁵⁵.

This crisis leads to "hidden energy poverty," where individuals limit energy consumption to avoid indebtedness, impacting their well-being⁵⁶. Housing quality also plays a crucial role, as inadequate buildings, with leaky roofs or damp walls, contribute to increased energy consumption and higher bills, disproportionately affecting marginalized groups, especially

⁵⁴ Clancy, J., Kustova, I., Elkerbout, M., & Michael, K. (2022). *The gender dimension and impact of the Fit for 55 package*. Retrieved from: [https://www.europarl.europa.eu/thinktank/en/document/IPOL_STU\(2022\)736899](https://www.europarl.europa.eu/thinktank/en/document/IPOL_STU(2022)736899)

⁵⁵ Eurofound. (2022). *The cost-of-living crisis and energy poverty in the EU: Social impact and policy responses – Background paper*. Retrieved from: <https://www.eurofound.europa.eu/publications/customised-report/2022/the-cost-of-living-crisis-and-energy-poverty-in-the-eu-social-impact-and-policy-responses-background>

⁵⁶ Eisfeld, K., & Seebauer, S. (2022). The energy austerity pitfall: Linking hidden energy poverty with self-restriction in household use in Austria. *Energy Research & Social Science*, 84, 102427.



women⁵⁷. The implications of energy poverty extend beyond financial strain, significantly affecting physical and psychological health. Cold living conditions increase the risks of respiratory and circulatory diseases, while the stress of living in a cold environment adversely affects mental health⁵⁸. Furthermore, inefficient use of firewood for heating leads to household air pollution, impacting health. Women, who remain primarily responsible for cooking, bear the impact of this pollution⁵⁹.

The measurement of energy poverty at the household level conceals gender disparities within households. Economic, physiological, and socio-cultural factors compound women's vulnerability to energy poverty, accentuating existing gender inequalities⁶⁰. Efforts to address energy poverty need to consider these gendered implications, as they can perpetuate existing inequalities if not specifically targeted. Ensuring energy-efficient housing and affordable energy access is crucial in mitigating the multifaceted impacts of energy poverty, particularly on women and vulnerable groups⁶¹.

3.2 Gender Inequalities in the Energy Workforce

The energy sector in the EU remains one of the most gender imbalanced industries, evident in the overall representation of women and occupational and hierarchical gender

⁵⁷ Energy Poverty Advisory Hub. (2022). *Introduction to the Energy Poverty Advisory Hub (EPAH) Handbooks: A Guide to Understanding and Addressing Energy Poverty*. Retrieved from: https://energy-poverty.ec.europa.eu/discover/publications/publications/introduction-energy-poverty-advisory-hub-epah-handbooks-guide-understanding-and-addressing-energy_en

⁵⁸ Clair, A., & Baker, E. (2022). Cold homes and mental health harm: Evidence from the UK Household Longitudinal Study. *Social Science & Medicine*, 314, 115461. doi:10.1016/j.socscimed.2022.115461

⁵⁹ Clancy, J. S., & Feenstra, M. (2019). *Women, gender equality and the energy transition in the EU: Publications Office of the European Union*. Retrieved from: [https://www.europarl.europa.eu/RegData/etudes/STUD/2019/608867/IPOL_STU\(2019\)608867_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2019/608867/IPOL_STU(2019)608867_EN.pdf)

⁶⁰ Birgi, O. G., Fuhrmann, A., Habersbrunner, K., & Stock, A. (2021). *Gender and energy poverty Facts and arguments*. Retrieved from: https://www.wecf.org/de/wp-content/uploads/2018/10/EmpowerMed_Gender-and-energy-poverty-Factsheet-2021.pdf

Papadimitriou, E., Casabianca, E., & Cabeza Martinez, B. (2023). *Energy poverty and gender in the EU: the missing debate*. Retrieved from: <https://publications.jrc.ec.europa.eu/repository/handle/JRC132612>

⁶¹ Nieuwenhuis, R., & Zagel, H. (2022). Housing conditions of single mothers in Europe: the role of housing policies. *European Societies*, 1-27. doi:10.1080/14616696.2022.2117835



segregation⁶². Historically, the energy sector has been predominantly male-dominated, and its workforce remains disproportionately skewed compared to the broader population and workforce. According to 2018 data from 29 countries, there is a 76% underrepresentation of women compared to men in the energy sector, a significant contrast to the average 8% gap observed in the overall workforce⁶³. Within these countries, the average gender wage gap, considering skill levels, within the energy sector stands at around -15% indicating that women earn 15% less than men⁶⁴. In comparison, the non-energy sector displays a slightly smaller wage gap of -13%⁶⁵. The challenges faced by women in the energy sector mirror those encountered in other economic domains. Nevertheless, there is a pressing need for nations to attract and retain a diverse workforce in the energy sector to foster innovation and incorporate inclusive perspectives crucial for navigating the clean energy transition successfully. This ongoing transition towards sustainable and renewable energy presents valuable opportunities for a more inclusive energy workforce.

Analyzing employment and the green transition in the EU energy sector involves distinguishing between conventional and renewable energy supply sectors⁶⁶. Conventional energy encompasses nuclear, oil, gas, and coal industries, while renewable energy includes hydro, wind, ocean, bioenergy, solar photovoltaic (PV), and concentrate solar power⁶⁷. Globally, women constitute 22% of the conventional energy sector workforce⁶⁸ and are typically relegated to administrative roles with limited decision-making authority. In contrast, the global share of women in the renewable energy sector is 32%⁶⁹. There is a scarcity of sex-disaggregated data in both sectors⁷⁰, with no regularly collected official EU-wide data specifically addressing gender inequalities in employment in the EU renewable energy sector.

⁶² Czako, V. (2020). *Employment in the energy sector: status report 2020*. EUR 30186 EN, Publications Office of the European Union, Luxembourg, ISBN 978-92-76-18206-1, doi:10.2760/95180, JRC120302.

EIGE. (2012). *Review of the Implementation in the EU of area K of the Beijing Platform for Action: Women and the Environment Gender Equality and Climate Change*. Retrieved from:

<https://eige.europa.eu/lt/publications/gender-equality-and-climate-change-report>

⁶³ IEA. (2023). *Gender and Energy Data Explorer*. Retrieved from: <https://www.iea.org/data-and-statistics/data-tools/gender-and-energy-data-explorer?Topic=Employment&Indicator=Gender+wage+gap+conditional+on+skills>

⁶⁴ Ibid.

⁶⁵ Ibid.

⁶⁶ Czako (2020). *Employment in the energy sector: status report 2020*

⁶⁷ Ibid.

⁶⁸ IEA (2023). *Gender and Energy Data Explorer*.

⁶⁹ IRENA (2019). *Renewable Energy: A Gender Perspective*. ISBN: 978-92-9260-098-3. Retrieved from: <https://www.irena.org/publications/2019/Jan/Renewable-Energy-A-Gender-Perspective>

⁷⁰ Clancy, J. S., & Feenstra, M. (2019). *Women, gender equality and the energy transition in the EU*.



In the EU, women make up 24% of the conventional energy sector's labor force, with participation varying across Member States (Figure 5). Portugal, France, and Spain demonstrate more gender balance, with 34%, 32%, and 31% of women, respectively. Croatia, Romania, and Poland exhibit the lowest women's participation, ranging from 12% to 14%⁷¹.

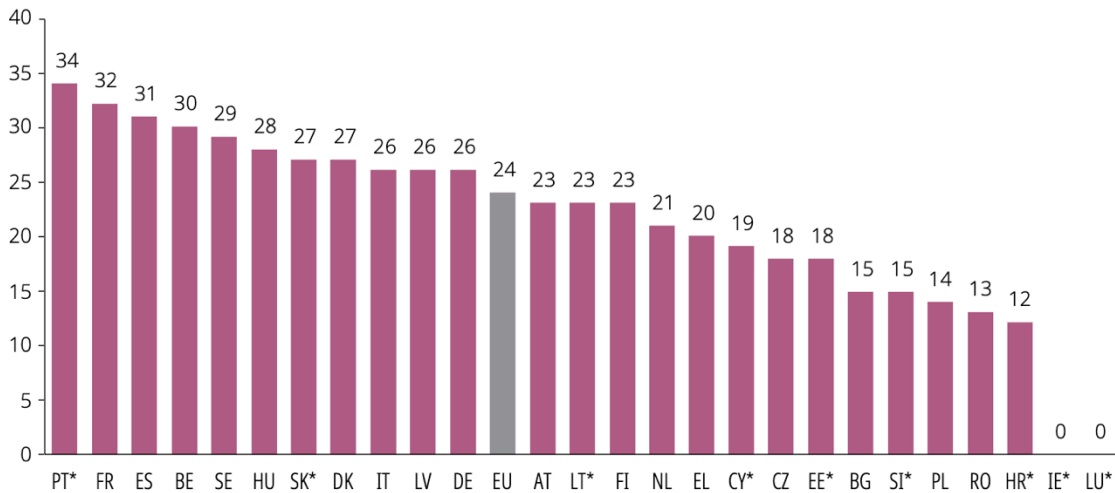


Figure 5 Share of women employed in the energy sector, by Member State (% , EU, 2022).

Taken by EIGE (2023) Gender Equality Index. *Low reliability

Women are underrepresented across all subsectors of conventional energy, with the electricity and gas supply sector being the most equal, employing 28% women in 2021. The coal-mining sector remains highly imbalanced, employing only 12% women in 2021, showing minimal progress over a decade (2 pp increase)⁷². Representation also varies across sectors, with the global solar photovoltaic energy sector having a closer gender balance at 40%, compare to, for instance, the global wind energy sector at 21%⁷³. Higher-skilled technical, engineering, operative, and leadership positions specifically show lower representation of women, indicating a gender gap in relevant skills and the difficulties for women to advance into higher-skilled roles. For instance, in the electricity and gas sector, only 20% of women

⁷¹ EIGE (2023) Gender Equality Index, pp. 96.

⁷² Ibid.

⁷³IRENA (2020). *Wind energy: A gender perspective*. ISBN: 978-92-9260-171-3. Retrieved from:

<https://www.irena.org/publications/2020/Jan/Wind-energy-A-gender-perspective>

IRENA. (2022). *Solar PV: A gender perspective*. ISBN: 978-92-9260-466-0. Retrieved from:

<https://www.irena.org/Publications/2022/Sep/Solar-PV-Gender-Perspective>



hold supervisory positions compared to 34% of men⁷⁴. The presence of a ‘sticky floor’⁷⁵ in women’s careers is evident limiting opportunities for exchanges, competence development, mentoring programs, or professional networks, particularly emphasized in the renewable, wind, and solar PV sectors⁷⁶.

Limited sex-disaggregated data on research and innovation reveals low women's participation in these areas across EU countries. In 2020, Croatia had the highest share of women in research and innovation personnel in the electricity and gas sector, while the lowest shares were observed in Slovenia and Czechia (12% women)⁷⁷. According to IEA data, in 2021, only 8.7% of patents were from female inventors, and clean energy transition technologies were slightly more gender balanced (18.1%) compared to fossil fuel technologies (17.5%)⁷⁸. Gender imbalances in the energy workforce and research sector have significant implications due to differing needs and realities for women and men. Neglecting women's perspectives in the green transition risks policy decisions based on a gender data gap and unintentionally worsening gender inequalities⁷⁹.

Addressing the expanding labor demand in the energy sector necessitates enhancing its appeal for both men and women in skilled roles, requiring a resolution to the persistent gender disparities⁸⁰. The sustained existence of structural gender inequalities hinders women's educational choices, entry, and retention in the energy workforce, adding urgency to the call for a more inclusive and diverse environment within the sector amid the transformative shift towards clean energy sources.

3.3 Gender Gaps in STEM Education

There are many factors that influence women’s transition into STEM (see Figure 6). The interest of women in STEM subjects is significantly influenced during two crucial

⁷⁴ EIGE (2023) Gender Equality Index.

⁷⁵ EIGE (2026) Glossary “*Expression used as a metaphor to point to a discriminatory employment pattern that keeps workers, mainly women, in the lower ranks of the job scale, with low mobility and invisible barriers to career advancement.*” Retrieved from:

https://eige.europa.eu/publications-resources/thesaurus/terms/1374?language_content_entity=en

⁷⁶ IRENA (2020). *Wind energy: A gender perspective.*

⁷⁷ Ibid.

⁷⁸ IEA (2023). *Gender and Energy Data Explorer.*

⁷⁹ Criado-Perez, C. (2019). *Invisible women: data bias in a world designed for men.* New York: Abrams Press.

⁸⁰ Clancy, J. S., and Feenstra, M. (2019). *Women, gender equality and the energy transition in the EU.*



developmental periods in their life cycle: childhood and adolescence, as well as emerging adulthood. In childhood, socialization begins, shaping expectations for the behavior of both genders. Research, such as that by UNESCO in 2017, indicates that children grasp gender stereotypes by their first year, mimic same-sex peers by age two, and internalize these stereotypes by age four⁸¹. During their socialization process, boys are motivated to investigate the physical world, understand mechanisms, and solve problems, while girls are encouraged to focus on social interactions and participate in group activities. Girls are often raised to view STEM fields as ‘masculine’ and that females inherently possess inferior abilities in this domain compared to males⁸². Such beliefs can erode girls’ confidence, diminish their interest, and discourage their willingness to participate in STEM subjects.

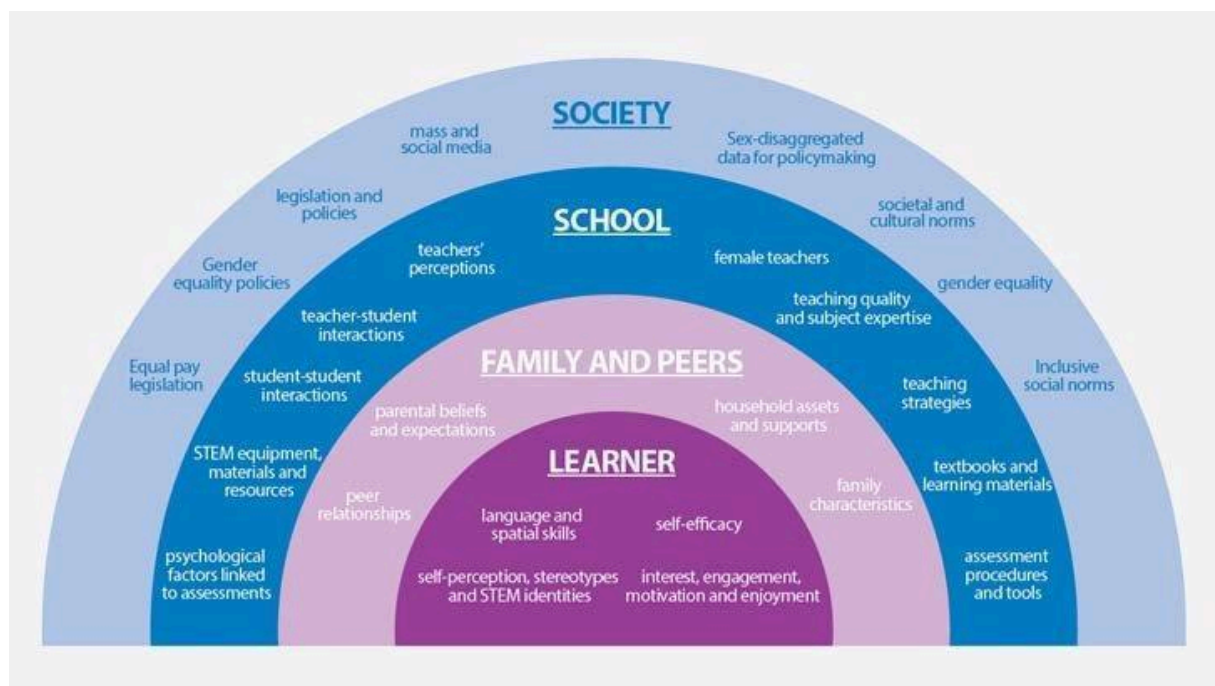


Figure 6 Ecological framework of factors influencing girls’ and women’s participation, achievement, and progression in STEM studies

Source: [UNESCO, 2017: 40](#)

Mothers play a pivotal role, influencing their daughters’ motivation and persistence in science and math, although they may also contribute to gender stereotypes⁸³. During adolescence,

⁸¹ UNESCO (2017). *Cracking the code: girls’ and women’s education in science, technology, engineering and mathematics (STEM)*. Retrieved from: <https://unesdoc.unesco.org/ark:/48223/pf0000253479>

⁸² Ibid.

⁸³ Leaper, C., Farkas, T. & Brown, C.S. (2011) ‘Adolescent girls’ experiences and gender-related beliefs in relation to their motivation in math/science and English’, *Journal of Youth and Adolescence*, 41(3), pp. 268–282. doi:10.1007/s10964-011-9693-z.

Jacobs, J. E. (1991). Influence of gender stereotypes on parent and child mathematics attitudes. *Journal of Educational Psychology*, 83(4), 518–527. <https://doi.org/10.1037/0022-0663.83.4.518>.



female friends become influential in girls' decisions about STEM subjects, particularly in mathematics, where collaborative environments positively impact interest and performance⁸⁴. Female STEM teachers also hold significant sway, acting as role models and dismissing myths about innate abilities⁸⁵. The presence of role models is thought to improve girls' self-perceptions and attitudes towards STEM, thereby making STEM careers a more acceptable option⁸⁶.

Somewhat concerning is research in the UK, indicating that a significant percentage of male teachers (29%) believe that STEM careers are more suitable for boys than girls, and 24% of all surveyed teachers lack confidence or are unaware of the job opportunities available for girls pursuing STEM careers⁸⁷. All teachers contribute to shaping STEM choices, often unknowingly perpetuating stereotypes. A study in the UK and Ireland found that 57% of teachers held subconscious gender stereotypes⁸⁸.

As adolescents (ages 11-17) make career decisions, a decline in STEM interest is observed, particularly for girls, who drop out earlier than boys. A study in the UK reveals that when entering secondary education (around age 10-11), boys and girls express nearly equal interest in STEM subjects (75% of boys and 72% of girls)⁸⁹. However, by age 18, girls' interest in STEM advanced studies significantly decreases compared to boys⁹⁰. Career aspirations seem to be largely formed by age 13, making interventions more challenging later on⁹¹. Inadequate careers education for girls further hampers overcoming negative perceptions about STEM⁹².

⁸⁴ Wang, M.-T. (2012). Educational and career interests in math: A longitudinal examination of the links between classroom environment, motivational beliefs, and interests. *Developmental Psychology*, 48(6), 1643–1657. <https://doi.org/10.1037/a0027247>.

⁸⁵ UNESCO (2017). *Cracking the code: girls' and women's education in science, technology, engineering and mathematics (STEM)*.

Su, R., Rounds, J., & Armstrong, P. I. (2009). Men and things, women and people: A meta-analysis of sex differences in interests. *Psychological Bulletin*, 135(6), 859–884. <https://doi.org/10.1037/a0017364>

⁸⁶ Ibid.

⁸⁷ Engineering UK (2018) Briefing: Gender Disparity in Engineering. Retrieved from: <https://www.engineeringuk.com/media/1691/gender-disparity-in-engineering.pdf>

⁸⁸ Accentuate, 2017, as cited in UNESCO (2017) *Cracking the code: girls' and women's education in science, technology, engineering and mathematics (STEM)*.

⁸⁹ Kerney, A.T., & YourLife (2016) *Tough Choices: The Real Reasons A-level Students are Steering Clear of Science and Maths*. Retrieved from: <https://www.genderportal.eu/resources/tough-choices-real-reasons-level-students-are-steering-clear-science-and-maths>

⁹⁰ Engineering UK (2018). Briefing: Gender Disparity in Engineering.

⁹¹ Lindahl, 2007, as cited in UNESCO (2017) *Cracking the code: girls' and women's education in science, technology, engineering and mathematics (STEM)*.

⁹² Engineering UK (2018). Briefing: Gender Disparity in Engineering.



Early socialization also influences subject choices, with girls gravitating towards careers perceived as having strong social goals (e.g. social work, nursing, teaching, etc.) and distancing themselves from those perceived as lacking social relevance, such as astronomy and engineering⁹³. Stereotypes portraying STEM as masculine and disconnected from social goals persist, contributing to girls' lower self-belief in their innate ability to excel in science⁹⁴. The OECD's three-yearly assessment of the reading, math, and science proficiency of 15-year-olds globally revealed that girls consistently exhibit lower self-confidence in their innate ability to excel in science compared to boys. This gender disparity is particularly pronounced in Denmark, France, Germany, Iceland, and Sweden⁹⁵.

Distinct gender-based trends are evident in higher education⁹⁶. Men predominantly constitute the majority of students in engineering, manufacturing, construction, and information and communication technology studies, and to a lesser degree in other fields (Figure 7). Conversely, women outnumber men in education, arts, health, welfare, humanities, social sciences, journalism, business, and law disciplines.

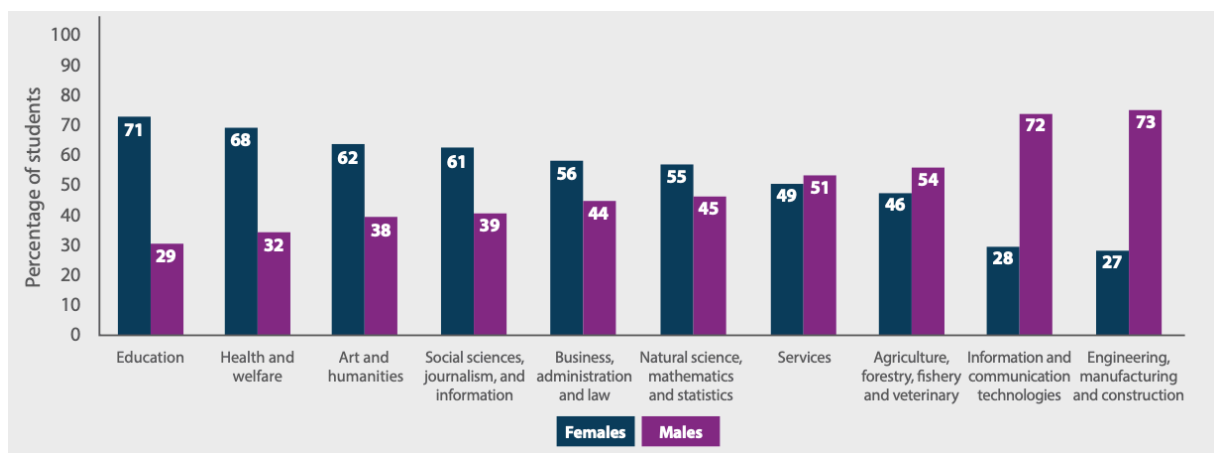


Figure 7 Share of female and male students enrolled in higher education, by field of study, global average

Source: [UNESCO, 2017: 20](#)

⁹³ Su, R., Rounds, J., & Armstrong, P. I. (2009). Men and things, women and people: A meta-analysis of sex differences in interests.

Clancy, J. & Feenstra, M. (2019). *Women, gender equality and the energy transition in the EU*.

⁹⁴ OECD (2015), *The ABC of Gender Equality in Education: Aptitude, Behaviour, Confidence*, PISA, OECD Publishing. <http://dx.doi.org/10.1787/9789264229945-en>

⁹⁵ Ibid.

⁹⁶ UNESCO (2017). *Cracking the code: girls' and women's education in science, technology, engineering and mathematics (STEM)*.



Entering STEM fields often places women in the minority, leading to feelings of not belonging, demotivation, lower grades, and thoughts of leaving the course⁹⁷. Professional networks, especially those formed during education, can play a crucial role in fostering a sense of belonging and employment opportunities⁹⁸.

3.4 Gender Gaps in Decision-Making

As the impacts of climate change continue to unfold and pose threats to global livelihoods, the responsibility falls on decision-makers, including government officials and influential scientific bodies, to reverse current trends and guide systems and communities toward sustainability⁹⁹. According to 2022 data from EIGE's Gender Statistics Database¹⁰⁰, women in the EU remain underrepresented in decision-making roles related to the environment and climate change. Additionally, a gender perspective is often lacking in decisions pertaining to areas such as transport and energy.

At the national level, 67% of senior ministers in EU Member States with portfolios related to the environment or climate change are men. However, senior ministerial administrators dealing with these issues show better gender balance, with 44% being women in the EU¹⁰¹. Furthermore, 70% of members on parliamentary committees addressing environmental and climate change issues are men, with some countries, including Latvia, Romania, Cyprus, Slovenia, Slovakia, and Estonia, having fewer than 20% women on these committees. On the other hand, Sweden, Italy, and Malta boast gender-balanced parliamentary committees on these matters.

Within the European Commission's directorates-general (DGs) related to the environment, political positions are generally gender-balanced for commissioners and cabinet members,

⁹⁷ Cheryan, S., Master, A. & Meltzoff, A.N. (2015), 'Cultural stereotypes as gatekeepers: increasing girls' interest in computer science and engineering by diversifying stereotypes', *Frontiers in Psychology* 6 (Article 49), pp. 1-8. Stout, J. G., Dasgupta, N., Hunsinger, M., & McManus, M. A. (2011) 'STEMing the tide: Using in-group experts to inoculate women's self-concept in science, technology, engineering, and mathematics (STEM)'. *Journal of Personality and Social Psychology*, 100, pp. 255-270.

⁹⁸ Clancy, J. & Feenstra, M. (2019). *Women, gender equality and the energy transition in the EU*.

⁹⁹ EIGE (2023) Gender Equality Index.

¹⁰⁰ EIGE (2022) Gender Statistics Database. Available at:
<https://eige.europa.eu/gender-statistics/dgs/browse/wmidm>

¹⁰¹ EIGE (2023) Gender Equality Index.



except for DG Environment, where the cabinet is 71% women¹⁰². However, all heads of cabinet in the relevant DGs (Climate Action, Energy, Mobility and Transport, and Environment) are men. Examining environment-related committees in the European Parliament, two out of three presidents/leaders of relevant committees are men, with only one woman leading the Transport and Tourism Committee¹⁰³.

In European agencies focusing on areas related to the environment and climate change, five out of eight have male presidents/chairs, and all eight agencies have a male majority among members of the highest decision-making body. Overall, only 27% of members in these highest decision-making bodies are women¹⁰⁴. Furthermore, all executive heads are men, except for the European Maritime Safety Agency, which is headed by a woman.

Achieving greater gender balance in decision-making on environmental matters is crucial for fostering a socially fair process in climate adaptation, mitigation, and resilience.

3.5 Further Domains

In addition to the prominent themes of energy access, workforce inequalities, STEM education, and decision-making, it is imperative to delve into further domains that intricately intersect with the experiences of women in the clean energy sector. The subsections of Care, Health, and Violence illuminate the multifaceted dimensions of gender disparities within this context.

3.5.1 Care

The provision of unpaid care work and childcare in the EU predominantly falls on women due to historical gendered social roles, stereotypes, and power dynamics. This unequal distribution significantly impacts women's lives, hindering their equal participation in the labour market and public life, with far-reaching consequences.

¹⁰² EIGE (2023) Gender Equality Index.

¹⁰³ Ibid.

¹⁰⁴ Ibid.



According to EIGE's EU-wide survey¹⁰⁵ on unpaid care, women are more involved in everyday caregiving, with 34% of women compared to 25% of men participating in unpaid care activities. Disparities are even more pronounced in cooking and housework, with 63% of women and only 36% of men engaging in these tasks daily. Since 2016, there has been a slight reduction in the gender gap for unpaid care (-3 pp) and a significant decrease for housework and cooking activities (-19 pp), mainly due to decreased engagement among women¹⁰⁶.

Individuals aged 25-49, often with children, bear the highest share of caregiving responsibilities, with 48% of women and 34% of men in this group. Women in this age group also engage in daily housework or cooking at higher rates than men, reflecting a "double gender gap."¹⁰⁷ In couples with children, women are disproportionately responsible for housework, with 72% of women compared to 35% of men reporting daily involvement.

Childcare responsibilities heavily influence individuals' time allocation and work-life balance. Women predominantly shoulder childcare duties, with 56% spending at least 5 hours daily on childcare, compared to 26% of men¹⁰⁸. Furthermore, men engaged in childcare tend to allocate more time to leisure activities, with 38% spending 1 to 3 hours a day on leisure, compared to 29% of women¹⁰⁹. This unequal sharing of childcare responsibilities contributes to gender inequalities in the labour market, with 70% of women with childcare responsibilities working in paid employment, compared to 84% of men¹¹⁰. Women are also more likely to work part-time, impacting their long-term career and financial prospects. This reinforces the perception that caregiving is primarily a women's role, potentially limiting their professional advancement and work-life balance.

The uneven distribution of unpaid care and household tasks influences energy consumption patterns (carbon footprint) and the willingness, and ability to embrace more eco-friendly behaviours¹¹¹. Existing research suggests that women are more inclined to adopt sustainable household practices, such as food sustainability, energy conservation, recycling, and waste

¹⁰⁵ EIGE (2023). *Survey of Gender Gaps in Unpaid Care, Individual and Social Activities (CARE)*. Retrieved from:

https://eige.europa.eu/about/projects/survey-gender-gaps-unpaid-care-individual-and-social-activities-care-1st-wave/?language_content_entity=en

¹⁰⁶ EIGE (2023) Gender Equality Index.

¹⁰⁷ Ibid. pp. 46.

¹⁰⁸ EIGE (2023). *A Better Work-Life Balance: Bridging the gender care gap*. Retrieved from:

<https://eige.europa.eu/publications-resources/publications/better-work-life-balance-bridging-gender-care-gap>

¹⁰⁹ Ibid.

¹¹⁰ Ibid.

¹¹¹ EIGE (2023) Gender Equality Index.



reduction¹¹². This trend aligns with the growing popularity of “zero-waste” practices, which predominantly focus on household activities like cooking, cleaning, and grocery shopping, tasks typically undertaken by women¹¹³. The findings from the EIGE survey on gender disparities in unpaid care and individual and social activities support these conclusions. A larger proportion of women (59%) than men (53%) report regularly opting for environmentally friendly options in their household chores, including recycling, using eco-friendly cleaning products, and utilizing renewable energy to minimize carbon emissions¹¹⁴. Given the evolving climate conditions, there is likely to be an increasing demand for both formal and informal care, underscoring the importance of sustainable and environmentally conscious actions in these domains. Extreme weather events are expected to disproportionately impact already vulnerable groups, such as children, individuals with disabilities, and older adults, who may require more extensive informal care¹¹⁵. This heightened demand is also likely to strain existing formal care systems, exacerbating their already burdensome workload.

3.5.2 Health

Research underscores significant gender-specific impacts of climate change on physical and mental health, influenced by factors like socioeconomic status, age, disability, ethnic background, migration status, and education¹¹⁶. In Europe, rapidly rising temperatures contribute to more frequent and severe heatwaves, posing heightened health risks, especially

¹¹² Carlsson-Kanyama, A., Nässén, J., & Benders, R. (2021). Shifting expenditure on food, holidays, and furnishings could lower greenhouse gas emissions by almost 40 %. *Journal of Industrial Ecology*, 25(6), 1602-1616. doi:10.1111/jiec.13176

Wilde, M. de, & Parry, S. (2022). Feminised concern or feminist care? Reclaiming gender normativities in zero waste living. *The Sociological Review*, 70(3), 526-546. <https://doi.org/10.1177/00380261221080110>

¹¹³ EIGE (2023) Gender Equality Index. pp. 48.

¹¹⁴ EIGE (2023). *Survey of Gender Gaps in Unpaid Care, Individual and Social Activities (CARE)*.

¹¹⁵ EIGE (2023) Gender Equality Index.

¹¹⁶ EEA. (2022). *Economic losses and fatalities from weather- and climate-related events in Europe*. Retrieved from: <https://www.eea.europa.eu/publications/economic-losses-and-fatalities-from>

Global Gender and Climate Alliance. (2016). *Gender and climate change: A closer look at existing evidence*. Retrieved from: <https://wedo.org/wp-content/uploads/2016/11/GGCA-RP-FINAL.pdf>



for the 75% of the EU population living in urban areas and the 21% aged 65 and older¹¹⁷. The most socioeconomically disadvantaged groups, including Roma and racial minorities, often inhabit urban areas already facing environmental hazards like water and air pollution and toxic waste¹¹⁸.

Older women, particularly those with existing health issues, face elevated mortality rates during heatwaves¹¹⁹. Factors contributing to this vulnerability include gendered socioeconomic marginalization, physical and social isolation, inadequate housing, limited access to cooling mechanisms, and healthcare, especially among marginalized communities¹²⁰. Heatwaves are also linked to increased prevalence and severity of mental health disorders, exacerbating pre-existing conditions and heightening suicide risks, especially among men¹²¹. Mental health challenges are further aggravated by extreme weather events and natural disasters, along with the increased unpaid care responsibilities resulting from these climate-related disasters¹²². The European Climate and Health Observatory (2022)¹²³

¹¹⁷ WMO (2022). *State of the Climate in Europe 2021*. Retrieved from: https://library.wmo.int/index.php?lvl=notice_display&id=22152#.ZDaX2-ZByUm

Kazmierczak, A., Lowe, R., van Daalen, K. R., Johnson, K., Dasgupta, S., & Robinson, E. (2022). *Climate change as a threat to health and well-being in Europe: focus on heat and infectious diseases*. Retrieved from: <https://www.eea.europa.eu/publications/climate-change-impacts-on-health>

Romanello, M., van Daalen, K., Anto, J. M., Dasandi, N., Drummond, P., Hamilton, I. G., & Rocklöv, J. (2021). Tracking progress on health and climate change in Europe. *The Lancet Public Health*, 6(11), e858-e865. [https://doi.org/10.1016/S2468-2667\(21\)00207-3](https://doi.org/10.1016/S2468-2667(21)00207-3)

¹¹⁸ EEA (2020). *Healthy environment, healthy lives: how the environment influences health and well-being in Europe*. Retrieved from: <https://www.eea.europa.eu/publications/healthy-environment-healthy-lives>

EEB (2020). *Pushed to the Wastelands: Environmental racism against Roma communities in Central and Eastern Europe*. Retrieved from: <https://eeb.org/wp-content/uploads/2020/04/Pushed-to-the-Wastelands.pdf>

¹¹⁹ D'Ippoliti, D., Michelozzi, P., Marino, C., de'Donato, F., Menne, B., Katsouyanni, K., Kirchmayer, U., Analitis, A., Medina-Ramón, M., Paldy, A., Atkinson, R., Kovats, S., Bisanti, L., Schneider, A., Lefranc, A., Iñiguez, C., & Perucci, C. A. (2010). The impact of heat waves on mortality in 9 European cities: Results from the euroheat project. *Environmental Health*, 9(1). <https://doi.org/10.1186/1476-069x-9-37>

Folkerts, M. A., Bröde, P., Botzen, W. J., Martinius, M. L., Gerrett, N., Harmsen, C. N., & Daanen, H. A. (2022). Sex differences in temperature-related all-cause mortality in the Netherlands. *International Archives of Occupational and Environmental Health*, 95(1), 249–258. <https://doi.org/10.1007/s00420-021-01721-y>

van Steen, Y., Ntarladima, A. M., Grobbee, R., Karssenbergh, D., & Vaartjes, I. (2019). Sex differences in mortality after heat waves: are elderly women at higher risk?. *International archives of occupational and environmental health*, 92(1), 37–48. <https://doi.org/10.1007/s00420-018-1360-1>

¹²⁰ Folkerts et al., (2022). Sex differences in temperature-related all-cause mortality in the Netherlands. Romanello et al. (2021). Tracking progress on health and climate change in Europe.

¹²¹ Thompson, R., Hornigold, R., Page, L., & Waite, T. (2018). Associations between high ambient temperatures and heat waves with mental health outcomes: a systematic review. *Public health*, 161, 171-191.

¹²² EIGE (2023). Gender Equality Index.

¹²³ European Climate and Health Observatory. (2022). *Climate change impacts on mental health in Europe*. Retrieved from:

https://climate-adapt.eea.europa.eu/en/observatory/evidence/health-effects/mental-health-effects/european_climate_health_observatory_mental-health_evidence_review_2022.pdf



highlights increasing levels of eco-anxiety¹²⁴ among children and young people, particularly among young women.

Approximately 2.3 billion individuals worldwide utilize open fires or inefficient stoves fueled by kerosene, biomass (such as wood, animal dung, and crop waste), and coal, contributing to harmful household air pollution. In 2020, household air pollution was accountable for an estimated 3.2 million deaths annually, with over 237,000 of these deaths occurring among children under the age of 5¹²⁵. The combined impact of both ambient and household air pollution is associated with 6.7 million premature deaths each year. Exposure to household air pollution is linked to the development of noncommunicable diseases like stroke, ischemic heart disease, chronic obstructive pulmonary disease (COPD), and lung cancer¹²⁶. Women and children, typically tasked with household duties like cooking and gathering firewood, experience the greatest health repercussions from the use of polluting fuels and technologies in homes. It is imperative to promote the adoption of clean fuels and technologies to mitigate household air pollution and safeguard public health.

3.5.3 Violence

The most severe expression of gender inequality is gender-based violence. Gender-based violence is “a daily, global phenomenon, affecting women and young girls, but also LGBTI+ people, disproportionately. It includes any harmful act, against the dignity and integrity of those who suffer from it. It is distinguished from other forms of violence as it stems from a historically established inequality between men and women both in social power and power relations, which has led to men’s dominance over women and the discrimination against them.”¹²⁷ Climate change exacerbates inequalities and acts as a risk multiplier¹²⁸.

¹²⁴ “The chronic fear of environmental cataclysm that comes from observing the seemingly irrevocable impact of climate change and the associated concern for one’s future and that of next generations” (Clayton et al., 2017, as seen at European Climate and Health Observatory, 2022, pp. 2)

¹²⁵ WHO (2023). *Household air pollution*. Retrieved from:

<https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health>

¹²⁶ Ibid.

¹²⁷ Diotima (2022). *Terminologies “What is gender-based violence?”*. Retrieved from:

<https://diotima.org/en/terminologies/>

¹²⁸ Office of the High Commissioner for Human Rights. (2022). *Climate change exacerbates violence against women and girls*. Retrieved from:

<https://www.ohchr.org/en/stories/2022/07/climate-change-exacerbates-violence-against-women-and-girls>



The climate crisis and environmental degradation escalate various forms of gender-based violence including physical, sexual, psychological, and economic especially within intimate partner relationships¹²⁹. A systematic review conducted by Kim Robin van Daalen et al., (2022)¹³⁰ showed that during or after natural disasters, vulnerability to intimate partner violence, heightened by increased mental strain, becomes more pronounced, with women facing elevated risks during evacuations and stays in emergency shelters. Moreover, access to support systems like social protection, law enforcement, and healthcare is hindered in crisis situations¹³¹.

While commonly associated with the Global South, evidence suggests a rise in gender-based violence during crises extends to the "developed world" as well¹³². A study in Spain links heatwaves to increased incidents of intimate partner violence¹³³, and in Australia, droughts and financial stress were found correlated with rising rates of violence against women, including psychological and economic abuse¹³⁴. Beyond crisis situations, concerns about safety from gender-based violence and sexual harassment influence women's use of public transportation especially regarding mode, route, and timing¹³⁵. Women often avoid traveling at night and opt out of poorly lit or overcrowded transportation options due to the heightened risks of sexual harassment and violence¹³⁶. Unfortunately, safety issues, particularly regarding sexual harassment, are often overlooked in transport planning and efforts to promote public transportation usage. The fear of violence and crime in and around public transportation also significantly affects the travel decisions of lesbian, gay, bisexual, trans, queer, and intersex individuals. A study in the UK and Israel found that many LGBTIQ individuals conceal their identity and visibility, incur higher costs by opting for taxis instead of

¹²⁹ EIGE (2023). Gender Equality Index.

¹³⁰ van Daalen, K. R., Kallesøe, S. S., Davey, F., Dada, S., Jung, L., Singh, L., Issa, R., Emilian, C. A., Kuhn, I., Keygnaert, I., & Nilsson, M. (2022). Extreme events and gender-based violence: a mixed-methods systematic review. *The Lancet. Planetary health*, 6(6), e504–e523. [https://doi.org/10.1016/S2542-5196\(22\)00088-2](https://doi.org/10.1016/S2542-5196(22)00088-2)

¹³¹ Ibid.

¹³² Caridade, S. M. M., Vidal, D. G., & Dinis, M. A. P. (2022). Climate change and gender-based violence: outcomes, challenges and future perspectives. In *Sustainable Policies and Practices in Energy, Environment and Health Research* (pp. 167-176): Springer.

van Daalen et al., (2022). Extreme events and gender-based violence: a mixed-methods systematic review.

¹³³ Sanz-Barbero, B., Linares, C., Vives-Cases, C., González, J. L., López-Ossorio, J. J., & Díaz, J. (2018). Heat wave and the risk of intimate partner violence. *Science of the total environment*, 644, 413-419.

¹³⁴ Whittenbury, K. (2013). Climate change, women's health, wellbeing and experiences of gender based violence in Australia. In *Research, action and policy: Addressing the gendered impacts of climate change* (pp. 207-221): Springer.

¹³⁵ Afesojaye, O. E., Castillo, V. B., & Gómez, L. D. (2022). *Gender Equality and Safe and Secure Mobility*. Retrieved from: <https://claimingourspace.org/sdg5>

International Transport Forum (ITF) (2018). *Women's Safety and Security A Public Transport Priority*. Retrieved from: <https://www.itf-oecd.org/womens-safety-security>

¹³⁶ Ibid.



public transport, or choose indirect routes to ensure safer travel¹³⁷. Climate change intensifies gender-based violence, disproportionately affecting women, young girls, and marginalized communities worldwide, highlighting the urgent need for comprehensive strategies to ensure safer public spaces and support systems for survivors.

4 Gender Equality and Clean Energy Transition

The analysis undertaken in this report underscores the critical yet underexplored intersection of gender dynamics within the European Union's clean energy transition. Despite the EU's ambitious goals for gender equality and clean energy, significant disparities persist, requiring urgent attention and action.

The examination of women's experiences in the clean energy sector, guided by the frameworks of gender mainstreaming and intersectionality which emphasize the importance of recognizing the differential impacts of energy policies and practices on diverse gender identities, reveals a complex interplay of gender disparities across various domains. From energy access to workforce participation, STEM education, decision-making, caregiving responsibilities, health impacts, and experiences of violence, it is evident that women and femininities face multifaceted challenges and inequalities that intersect and exacerbate each other.

Applying the gender mainstreaming framework, which emphasizes integrating a gender perspective into all policies and programs, we recognize the importance of addressing gender disparities in energy access, workforce participation, and decision-making. Efforts to promote gender equality and social inclusion across all levels of decision-making, from policy formulation to program implementation, are essential for a just and sustainable transition to clean energy for all. Furthermore, employing the intersectionality framework, which acknowledges the intersecting identities and experiences that shape individuals' lives, we understand that gender inequalities in the clean energy sector are compounded by factors

¹³⁷ Amos Weintrob, Luke Hansell, Martin Zebracki, Yvonne Barnard & Karen Lucas (2021) Queer mobilities: critical LGBTQ perspectives of public transport spaces, *Mobilities*, 16:5, 775-791, DOI: 10.1080/17450101.2021.1958249



such as race, ethnicity, socioeconomic status, age, disability, and migration status. Comprehensive strategies to address gender disparities must consider these intersecting dimensions and prioritize the needs and realities of marginalized communities. By integrating the insights from these frameworks into policy development, education initiatives, workforce training programs, social support systems, and environmental justice efforts, stakeholders can work towards building a more equitable, resilient, and sustainable future for communities worldwide. It is imperative to promote gender equality and social inclusion not only as ethical imperatives but also as essential components of effective and sustainable clean energy transitions.

The pursuit of gender equality within the clean energy transition demands not only a reevaluation of existing structures but also the envisioning of transformative, ecofeminist energy systems. While the concept of gender mainstreaming has been pushed as a means of centering women's concerns within urban planning and energy projects, it often falls short of ecofeminist ideals. By narrowly defining women's needs based on traditional roles, such as motherhood, mainstreaming inadvertently excludes the diverse needs of other marginalized groups, failing to align with true ecofeminist imaginaries. Moving forward, a feminist perspective on initiatives like the European Green Deal offers a holistic approach to sustainability, challenging patriarchal, colonial, and capitalist structures that perpetuate inequalities. This transformative approach prioritizes care, justice, and inclusivity, centering gender equality as a core objective.

Practical implementation of gender-transformative policies requires comprehensive support, including awareness-raising efforts, data collection on the gender-environment nexus, and mechanisms for inclusive decision-making. By prioritizing equal participation and representation, the EU can pave the way for a more equitable and sustainable clean energy future for all. The needs and experiences of all individuals, regardless of gender or background, should be centered so we can create energy systems that not only sustain our planet but also foster equality, inclusivity, and hope for generations to come.

In conclusion, achieving gender equality in the clean energy transition demands a paradigm shift toward inclusive policies, transformative frameworks, and intersectional approaches that recognize and address the diverse needs and perspectives of all individuals within the EU and beyond.