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Conceptualization of Gendered Energy Ageism

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Abstract

The global transition towards low-carbon energy systems is a fundamental imperative of the twenty-first century, yet it risks deepening existing social inequalities if not managed equitably. While energy poverty and vulnerability have been extensively studied, the intersection of gender and age remains a critical blind spot in energy research and policy. This paper addresses this gap by conceptualizing "gendered energy ageism"—a novel framework that captures the unique structural and social discrimination faced by older women in energy access, affordability, and participation. Employing a theoretical analysis grounded in feminist intersectionality theory and the energy justice framework, the study delineates the economic, technological, policy, and social dimensions of this phenomenon. The proposed conceptual framework illustrates how demographic aging, gender wage gaps, and the digitalization of energy systems act as structural drivers that, through mechanisms of policy neglect and technological exclusion, produce disproportionate energy poverty and marginalization for older women. The paper concludes by outlining significant implications for energy and social policies, advocating for aging-inclusive and gender-sensitive transition strategies, and proposing a future research agenda to empirically measure and address gendered energy ageism.

Keywords: gendered energy poverty, ageism, energy justice, intersectionality, energy transition, sustainable energy, older women

1. Introduction

The global transition towards sustainable, low-carbon energy systems is fundamentally reshaping how energy is produced, distributed, and consumed. However, this transition is not merely a technological shift; it is a profoundly social process that produces unevenly distributed costs and benefits. While the imperative of a "just transition" has gained considerable prominence in both academic and policy discourses, modern energy systems continue to reproduce and sometimes exacerbate existing social inequalities. The Intergovernmental Panel on Climate Change (IPCC) and the International Energy Agency (IEA) have both acknowledged that the costs and benefits of decarbonization are not shared equitably, with vulnerable populations bearing disproportionate burdens.

A significant blind spot in current energy research is the overlooked intersection of gender and age. While the distinct impacts of energy poverty on women—often termed "gendered energy poverty"—have been increasingly recognized in the

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literature (Reframing Energy Poverty through a Gender Lens, FSR EUI, 2025), and the vulnerabilities of older adults in energy systems have begun to attract scholarly attention under the concept of "energy ageism" (Żuk & Żuk, 2022), the specific, compounded vulnerabilities experienced by older women remain profoundly underexplored. Older women frequently face a "double jeopardy" of discrimination and structural disadvantage: a lifetime of gender-based economic disparities culminates in inadequate pensions, while age-based exclusion from rapidly digitalizing energy markets compounds their marginalization.

The urgency of this issue is underscored by demographic realities. Europe is aging rapidly, and women constitute the majority of the elderly population, particularly among those aged 80 and above. The European Institute for Gender Equality (EIGE, 2024) has documented that women are at higher risk of energy poverty due to the gender pay gap and greater likelihood of living alone at older ages. Yet, despite these documented patterns, there is no established conceptual framework that specifically addresses the intersection of gender and age in the context of energy systems and transitions.

This paper argues that the emergence of these specific vulnerabilities necessitates a new conceptual lens. The primary objective of this study is to conceptualize "gendered energy ageism" as a distinct phenomenon within the broader energy justice framework. By integrating feminist intersectionality theory with the emerging literature on energy ageism, this paper seeks to answer three core research questions: (1) What is gendered energy ageism? (2) How does it manifest in energy systems and policies? (3) How can it be conceptualized within the energy justice framework to inform more equitable energy transitions?

The paper makes three primary contributions. First, it provides a formal definition of gendered energy ageism, bridging two previously siloed literatures. Second, it develops a conceptual framework comprising drivers, mechanisms, and outcomes that explains the structural logic of this phenomenon. Third, it derives concrete policy and research implications, providing an actionable agenda for scholars, policymakers, and practitioners committed to achieving equitable energy transitions.

2. Literature review

2.1 Ageism and structural age discrimination

Ageism, defined as stereotyping, prejudice, and discrimination directed towards people on the basis of their age, is a pervasive structural issue recognized by the World Health Organization as a major public health challenge. In public policy and services, ageism often manifests implicitly through the design of systems that assume a younger, more physically and digitally agile user base. Butler (1969) first coined the term to describe systematic discrimination against older people, and subsequent scholarship has documented its operation across healthcare, employment, and social services.

In the context of energy, Żuk and Żuk (2022) introduced the concept of "energy ageism," describing it as "all socially conditioned mechanisms related to energy policy that disable and discriminate against older people, reducing their quality of life through limited access—economically, technologically, spatially, informationally and culturally—to different energy sources, new energy technologies and the benefits of full access to energy circulation." This foundational concept identifies four primary dimensions of energy ageism: technological exclusion, economic exclusion, informational exclusion, and spatial exclusion. Szulecki et al. (2024) subsequently provided empirical validation of the concept through comparative research in Poland and Norway, finding that while socioeconomic conditions are the primary determinant of energy vulnerability in old age, digital competence gaps play a significant and growing role.

Żuk and Żuk (2024) further developed the spatial and social dimensions of energy ageism, demonstrating that rural older adults face compounded disadvantages due to the intersection of geographic remoteness and age-related vulnerabilities. Their work underscores that energy ageism is not a uniform phenomenon but is mediated by class, location, and the robustness of the welfare state.

2.2 Gender inequality in energy systems

Gender inequality is deeply embedded in energy systems at multiple levels. Research on gendered energy poverty highlights that women are disproportionately affected by energy insecurity due to structural economic disadvantages, such as the gender pay gap and higher rates of part-time or precarious employment. The European Economic and Social Committee (EESC, 2022) has documented that women are the main users and producers of household energy, yet are systematically underrepresented in energy decision-making at all levels.

Caretta (2025) conducted a systematic review of gender dimensions in just energy transitions, finding that women face structural barriers to participation in renewable energy markets, including limited access to finance, land rights, and technical education. Furthermore, traditional gender roles often dictate that women bear the primary responsibility for household energy management and caregiving, increasing their exposure to the negative health impacts of inadequate heating or cooling. Zhang et al. (2025) provide a critical review of quantitative methods for measuring gendered energy poverty, highlighting how feminist standpoints reveal how gendered energy poverty is shaped by structural power relations and intersecting social categories such as age, class, and ethnicity.

Despite these realities, energy policies frequently exhibit a gender bias, treating the "household" as a homogenous unit and failing to account for intra-household power dynamics and gender-specific energy needs. Raman (2025) demonstrates that women's participation in energy transitions leads to greater community engagement and increased household energy efficiency, yet policy frameworks rarely create structural conditions for such participation.

2.3 Energy justice framework

The energy justice framework provides a critical lens for evaluating the equity of energy systems. Developed by scholars including McCauley et al. (2013) and Heffron and McCauley (2017), the framework is typically structured around three core tenets. Distributional justice concerns the equitable allocation of environmental benefits and burdens, examining who bears the costs of energy production and who receives its benefits. Procedural justice emphasizes fair and inclusive decision-making processes, asking whether all affected communities have meaningful representation in energy governance. Recognition justice, arguably the most critical for marginalized groups, demands the acknowledgment of the distinct needs, rights, and historical marginalization of specific demographic groups.

Volodzkiene & Streimikiene (2025) demonstrate that without adequate understanding and engagement, vulnerable populations may lack the resources or motivation to transition to greener energy systems, highlighting the critical importance of recognition justice in practice. Current energy justice literature, however, often treats vulnerable groups as monolithic, failing to recognize how intersecting identities compound injustice. This paper argues that a fourth tenet—intersectional justice—is necessary to capture the compounded vulnerabilities of groups such as older women.

2.4 Intersectionality: gender and age

Feminist intersectionality theory, pioneered by Crenshaw (1989) and developed by Collins (2000), posits that social identities—such as gender, race, class, and age—do not exist independently but intersect to create complex systems of oppression and privilege. Cohen (2021) applied intersectionality to the study of older adults, demonstrating that the challenges of aging are profoundly shaped by other social identities, producing heterogeneous experiences of vulnerability and resilience.

Applying this to energy systems, older women are uniquely positioned at the nexus of energy poverty, digital exclusion, and policy invisibility. They are more likely to live alone, have lower retirement incomes due to interrupted career trajectories for caregiving, and face higher rates of chronic health conditions that increase their sensitivity to thermal discomfort. The gender pension gap—which averages 26% across the EU—directly translates into reduced capacity to afford adequate energy services in later life. Yet, as Zhang (2022) demonstrates, gender inequity in the health impacts of energy poverty remains significantly under-documented, with women's health more severely affected than men's in energy-poor households.

2.5 Research gap

Despite the growing bodies of literature on gendered energy poverty and energy ageism, there remains a distinct lack of conceptual integration between ageism and gender in energy research. Studies tend to examine either the impact of the energy transition on women or its impact on the elderly, rarely exploring the specific,

compounded discrimination faced by older women. Existing intersectional analyses in energy research remain rare and are often limited to the Global South context, where energy access challenges are more acute. In the European context, where the energy transition is most advanced, the specific vulnerabilities of older women in digitalized energy markets remain almost entirely unaddressed. This paper addresses this gap by formalizing the concept of gendered energy ageism and developing a conceptual framework for its analysis.

3. Conceptual foundations of gendered energy ageism

3.1 Defining gendered energy ageism

Building upon the foundational concepts of energy ageism (Żuk & Żuk, 2022) and gendered energy poverty (Zhang et al., 2025), this paper proposes the following formal definition: Gendered energy ageism refers to the structural and social discrimination in energy access, affordability, and participation that arises from the intersection of age-based and gender-based inequalities, disproportionately affecting older women. It is a systemic phenomenon where the cumulative disadvantages of a lifetime of gender inequality intersect with the exclusionary practices of modern, rapidly transitioning energy systems.

This definition has three key components. First, it is explicitly intersectional, recognizing that neither gender nor age alone is sufficient to explain the phenomenon; it is their interaction that produces a qualitatively distinct form of disadvantage. Second, it encompasses multiple domains—access, affordability, and participation—reflecting the multi-dimensional nature of energy justice. Third, it is structural in orientation, locating the causes of gendered energy ageism in systemic inequalities rather than individual deficits, thereby directing policy attention towards institutional reform rather than behavioral change.

3.2 Dimensions of gendered energy ageism

Gendered energy ageism operates across four primary dimensions, each of which reflects a distinct mechanism through which the intersection of gender and age produces energy disadvantage. Table 1 summarizes the four primary dimensions through which gendered energy ageism operates—economic, technological, policy, and social—identifying the core mechanism, primary manifestation, and recommended policy entry point for each dimension.

The economic dimension is driven by pension inequality. Because women historically earn less and take more career breaks for caregiving, they accumulate significantly lower pension wealth. The EU gender pension gap of approximately 26% means that older women have substantially less disposable income to meet energy costs, which are typically fixed and non-negotiable. This economic vulnerability is compounded by the fact that older women are more likely to live in single-person households, where per-capita energy costs are higher.

Table 1
Dimensions of Gendered Energy Ageism: Core Mechanisms, Manifestations, and Policy Entry Points

Dimension	Core Mechanism	Primary Manifestation	Policy Entry Point
Economic	Gender pension gap	Energy unaffordability on fixed income	Targeted energy subsidies; pension reform
Technological	Digital divide (age × gender)	Exclusion from smart energy markets	Digital literacy programs; non-digital access
Policy	Dual invisibility in governance	Absence from transition planning	Intersectional impact assessments
Social	Stereotyping and invisibility	Exclusion from energy citizenship	Participatory governance frameworks

Source: designed by the author.

The technological dimension reflects the intersection of age-related and gender-related digital divides. Older women, who statistically have lower rates of digital literacy and access to smart devices compared to younger cohorts and older men, are systematically excluded from the benefits of smart energy technologies. The digitalization of energy markets—through smart meters, app-based tariff management, and online-only customer service—creates new barriers that disproportionately affect older women.

The policy dimension captures the dual invisibility of older women in energy governance. Energy policies and transition strategies frequently suffer from both gender-blindness and age-blindness, and their intersection is almost entirely absent from policy frameworks. Transition policies such as subsidies for solar panels or electric vehicles often target homeowners with capital, implicitly excluding older women who may be renters or lack the necessary upfront investment capacity.

The social dimension encompasses the stereotypes and cultural assumptions that render older women invisible in energy discourse. They are rarely viewed as active "energy citizens" or "prosumers," marginalizing their voices and specific needs in the public sphere. This social invisibility reinforces and is reinforced by the other three dimensions, creating a self-perpetuating cycle of exclusion.

4. Conceptual framework

To systematically understand gendered energy ageism, this paper proposes a conceptual framework comprising three interconnected components: Drivers, Mechanisms, and Outcomes. This framework draws on the structural logic of energy

ageism (Żuk & Żuk, 2022) and extends it by incorporating the gender dimension through an intersectional lens (Table 2). Table 2 presents the three-component conceptual framework proposed in this paper. Structural drivers at the macro level operate through three mechanisms to produce three categories of adverse outcomes for older women in energy systems.

Macro-level structural drivers (demographic aging, gender wage and pension gaps, and digitalization of energy systems) operate through three mechanisms (structural inequalities, policy neglect, and technological barriers) to produce three categories of outcomes: deepened energy poverty, heightened health risks, and exclusion from the benefits of the energy transition.

The three drivers are structural in nature and operate at the macro level. Demographic aging is a well-documented trend across the developed world, with women constituting the majority of the elderly population due to their longer life expectancy. Gender wage and pension gaps are the cumulative result of decades of gendered labor market participation, including career interruptions for caregiving, part-time work, and occupational segregation. The digitalization of energy systems represents a structural transformation of energy markets that, while offering potential efficiency gains, simultaneously creates new barriers for those with limited digital competence.

These drivers operate through three primary mechanisms. Structural inequalities in housing and income ensure that older women have fewer resources to adapt to rising energy costs or to invest in energy efficiency improvements. Policy neglect occurs when transition strategies fail to incorporate intersectional vulnerability assessments, resulting in policies that are nominally universal but practically exclusionary. Technological barriers arise from the design of energy interfaces that assume a level of digital literacy and physical agility that many older women do not possess.

The outcomes of gendered energy ageism are severe and multidimensional. Deepened energy poverty manifests as an inability to maintain adequate thermal comfort, which has well-documented consequences for physical and mental health. Health risks are particularly acute for older women, who are more physiologically sensitive to temperature extremes and more likely to have chronic conditions exacerbated by cold or heat. Finally, exclusion from the benefits of energy transitions means that older women are unable to access the financial savings, improved air quality, and energy security that renewable energy and efficiency improvements offer to other demographic groups.

Table 2
Conceptual Framework of Gendered Energy Ageism: Drivers, Mechanisms, and Outcomes

Component	Elements	Description
Drivers	Demographic aging	Increasing share of older women in the population, with longer life expectancy than men
	Gender wage and pension gaps	Structural economic disparities accumulated over a lifetime of gendered labor market participation
	Digitalization of energy systems	Rapid shift towards smart, app-based energy management that assumes digital competence
Mechanisms	Structural inequalities	Housing tenure, income poverty, and health limitations that reduce adaptive capacity
	Policy neglect	Failure of transition strategies to incorporate intersectional vulnerability assessments
	Technological barriers	Design of energy interfaces that assume high digital literacy and physical agility
Outcomes	Deepened energy poverty	Disproportionate share of income spent on energy; inability to maintain thermal comfort
	Health risks	Increased morbidity and mortality from cold homes and heat stress
	Exclusion from transition benefits	Inability to access renewable energy, smart tariffs, or energy efficiency programs

Source: designed by the author.

5. Manifestations of gendered energy ageism

5.1 Energy poverty among older women

The most acute manifestation of gendered energy ageism is the disproportionate rate of energy poverty among older women. Due to the gender pension gap, older women, particularly those living alone, often spend a disproportionately high percentage of their fixed income on energy bills. Research by Cheng et al. (2026) demonstrates that menopausal women are at a greater risk of experiencing energy poverty compared to their non-menopausal counterparts, highlighting the biological dimension of gendered energy vulnerability that intersects with structural economic disadvantage.

The EIGE (2024) reports that women are at higher risk of energy poverty due to the gender pay gap and greater likelihood of living alone at older ages. In the EU, women aged 65 and over are significantly more likely than men of the same age to live in single-person households, where per-capita energy costs are higher and the fixed costs of maintaining a home cannot be shared. This demographic reality, combined with lower pension incomes, creates a structural predisposition to energy poverty that is both gendered and age-specific.

5.2 Barriers to participation in energy transitions

Older women face significant barriers to participating in the green energy transition. Financial instruments designed to promote renewable energy adoption, such as tax credits for rooftop solar or heat pumps, require substantial upfront capital that older women on fixed pensions typically lack. The design of these instruments implicitly favors homeowners with capital, systematically excluding renters and those with limited savings.

Furthermore, the complexity of navigating energy transition programs—which often require online applications, technical assessments, and engagement with multiple bureaucratic systems—creates procedural barriers that disproportionately affect older women with lower digital literacy. Caretta (2025) documents that structural barriers to women's participation in energy transitions include limited access to finance, information, and technical knowledge, all of which are compounded by age-related vulnerabilities.

5.3 Digital energy technologies and exclusion

The digitalization of the energy sector—characterized by smart meters, dynamic pricing contracts, and app-based customer service—acts as a profound exclusionary mechanism for older women. Thunshirn et al. (2025) demonstrate that adoption of home energy management systems is strongly influenced by digital competency and social status, with older adults facing significant barriers. Older women often face a double digital divide based on both age and gendered historical access to technology.

The inability to navigate digital energy platforms means that older women cannot access the cheapest energy tariffs, which are increasingly offered exclusively online.

They are effectively penalized by a system that rewards digital agility and punishes its absence. Moreover, the shift to online-only customer service for many energy providers creates a specific barrier for older women who are accustomed to in-person or telephone-based interactions.

5.4 Housing and Energy Efficiency Inequalities

Older women are more likely to reside in older, energy-inefficient housing stock. However, they often lack the financial means or the physical capacity to undertake deep retrofits. The intersection of age, gender, and housing tenure creates a particularly acute form of energy vulnerability. Older women who rent face the "split incentive" problem, where landlords have no motivation to improve energy efficiency, leaving the tenant to bear the burden of high energy costs in poorly insulated homes.

Research on energy poverty and gender in England (Bouzarovski & Tirado Herrero, 2017) demonstrates that gendered vulnerabilities in housing are likely to enhance energy poverty, with women more likely to be in fuel-poor households due to lower incomes and higher rates of renting. For older women, this housing-based vulnerability is compounded by the fact that they spend more time at home, increasing their exposure to inadequate thermal conditions.

6. Policy and research implications

6.1 Implications for energy policy

Energy policies must urgently adopt an intersectional lens that explicitly accounts for the compounded vulnerabilities of older women. This requires, first, the mandatory incorporation of intersectional impact assessments into the design of all energy transition policies, ensuring that the distributional consequences for older women are evaluated before implementation. Such assessments should disaggregate data by both age and gender, moving beyond the current practice of treating these as separate analytical categories.

Second, financial instruments for energy transition must be redesigned to be accessible to low-income, older households. Zero-upfront-cost models, on-bill financing, and targeted grants (rather than tax rebates, which benefit only those with sufficient tax liability) are more appropriate instruments for reaching older women on fixed incomes. The EU's Social Climate Fund, established under the Fit for 55 package, represents a step in this direction but requires explicit gender and age targeting to be effective.

Third, energy markets must retain non-digital avenues for customer support and tariff management. The regulatory framework should require energy suppliers to maintain accessible, non-digital service channels and to ensure that the most competitive tariffs are available through all channels, not only online. This is a matter of both consumer protection and energy justice.

6.2 Implications for social policy

Addressing gendered energy ageism requires coordination beyond the energy sector. Social policies must address the root economic causes, primarily by reforming pension systems to close the gender pension gap. This includes recognizing unpaid care work in pension calculations, extending pension coverage to part-time workers, and implementing minimum pension guarantees that prevent older women from falling into poverty.

Housing policies must prioritize the deep retrofitting of social housing and introduce stringent minimum energy efficiency standards for the private rental sector. The "Minimum Energy Efficiency Standards" approach, piloted in the United Kingdom, provides a model that could be adapted and strengthened across the EU to protect vulnerable older tenants. Additionally, targeted energy affordability programs—such as winter fuel payments or energy vouchers—should be designed with explicit recognition of the disproportionate vulnerability of older women living alone.

6.3 Implications for research

The academic community must move beyond siloed analyses of gender or age in energy research. There is a critical need for intersectional datasets that disaggregate energy consumption, poverty, and technology adoption data by both age and gender simultaneously. Current Eurostat and national energy survey data rarely provide this level of disaggregation, creating a fundamental evidence gap that limits both research and policy.

An interdisciplinary research agenda that bridges energy studies, gerontology, feminist economics, and public health is essential to fully capture the nuances of gendered energy ageism. Such an agenda should include qualitative research methods—including participatory action research with older women—to ensure that the lived experiences of this group inform conceptual and policy development.

7. Future research agenda

Future research should focus on the empirical measurement of gendered energy ageism. Developing specific metrics and indicators to quantify this intersectional vulnerability is a crucial next step, building on existing energy poverty measurement frameworks by adding gender and age disaggregation. A gendered energy ageism index, analogous to existing multidimensional poverty indices, could provide a powerful tool for both research and policy monitoring.

The four interconnected priority areas for future empirical and comparative research can be identified: (1) development of measurement metrics and a gendered energy ageism index; (2) cross-country comparative analysis across different welfare regimes; (3) integration with energy justice assessment frameworks; and (4) policy evaluation studies assessing the impact of just transition policies on older women.

Cross-country comparisons are needed to understand how different welfare regimes and energy market structures mitigate or exacerbate gendered energy ageism. The contrast between Nordic welfare states, with their robust social protection systems, and Central and Eastern European countries, with weaker welfare states and higher rates of energy poverty, provides a natural laboratory for such comparative analysis. Szulecki et al. (2024) have begun this work in the context of Poland and Norway, and this comparative approach should be extended to a broader range of country contexts.

Integration with energy justice metrics is another important direction. The energy justice framework provides a normative foundation for evaluating energy systems, but its operationalization for intersectional analysis remains underdeveloped. Future research should develop methods for incorporating gendered energy ageism into energy justice assessments, enabling a more comprehensive evaluation of the equity implications of energy transition policies.

Finally, policy evaluation studies must assess the actual impact of current "just transition" policies on older women, ensuring that theoretical commitments to equity translate into tangible improvements in their lived experiences. Such evaluations should employ mixed methods, combining quantitative analysis of energy poverty indicators with qualitative research on the experiences of older women navigating energy markets and transition programs.

8. Conclusion

This paper has conceptualized "gendered energy ageism" to highlight a critical, overlooked dimension of inequality within the global energy transition. By integrating the energy justice framework with feminist intersectionality theory and the concept of energy ageism, this study demonstrates that older women face unique, compounded forms of discrimination in modern energy systems that cannot be captured by either gender-focused or age-focused analyses alone.

The conceptual framework developed in this paper—comprising structural drivers (demographic aging, gender pension gaps, and digitalization), mechanisms (structural inequalities, policy neglect, and technological barriers), and outcomes (energy poverty, health risks, and exclusion from transition benefits)—provides a systematic foundation for both empirical research and policy development. The four dimensions of gendered energy ageism (economic, technological, policy, and social) offer a comprehensive analytical lens for identifying and addressing the specific vulnerabilities of older women in energy systems.

The theoretical integration presented here underscores that equitable energy transitions cannot be achieved through technology alone; they require a profound restructuring of policy to address the deep-seated economic, technological, and social marginalization of older women. The just transition discourse must expand its conception of vulnerability to include the intersectional disadvantages of older women, recognizing that the pursuit of carbon neutrality and the pursuit of social equity are not competing objectives but mutually reinforcing imperatives.

Recognizing and dismantling gendered energy ageism is not merely an academic exercise, but a fundamental prerequisite for achieving a truly just and sustainable energy future. As the energy transition accelerates, the window of opportunity to design inclusive systems is narrowing. The conceptual framework offered in this paper provides a starting point for the urgent work of ensuring that the transition to clean energy does not leave older women behind.

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