



User-Centred
Energy Systems

Making an inclusive and gender aware energy policy

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1. Introduction

This paper is an output of sub-task 2 of the Gender and Energy Research Programme within the User-Centred Energy Systems (UsersTCP) which is part of the IEA Technology Collaboration Programme. The sub-task set out to gain an understanding of the systematic inertias in the sociotechnical energy system hindering the formation of gender aware policies and interventions and then to identify ways of countering the inertias. This paper presents a synthesis of three case studies carried out within the subtask with some supporting evidence from other sources. The cases looked at different aspects of energy policy in three countries in Europe. The case studies of Austria and Sweden make gender analyses of their country's Integrated Energy and Climate Plans (Badieijaryani et al., 2022; Michael and Hultman, 2023). The case studies of Austria and the Netherlands look at the gender awareness of two actors in energy policy formulation. The Austrian case focuses on energy consultants (Hausner et al., 2023) and the Netherlands case (Clancy et al., 2024) looks at how the issue of energy poverty is framed, and policy responses are formulated by policy workers.

The paper starts with an outline of current understanding of energy poverty and its gender dimensions. It is followed by an analysis of energy policies in the three countries from a gender perspective. We then make some recommendations of how policy responses to energy poverty can be more gender-responsive and socially inclusive. We finish with some examples of good practice.

2. Gender dimensions and social inclusion aspects of energy poverty

There is no universally agreed definition of energy poverty. In 2023, the European Union agreed on a definition: energy poverty is a situation in which households are unable to access essential energy services that underpin a decent standard of living and health, such as adequate warmth through heating, cooling as temperatures rise, lighting and energy to power appliances (EU, 2023). This differs from the definition adopted in Austria's National Energy and Climate Plan (NECP), where: a household is considered energy poor if its income is below the at-risk-of-poverty threshold and, at the same time, it has to cover above-average energy costs (Austrian Federal Ministry for Sustainability and Tourism, 2019, p. 97). However, there is no identification of which groups of people differentiated by social characteristics such as gender, age, class and ethnicity, are considered to be vulnerable to energy poverty. Sweden's NECP does not treat energy poverty differently to poverty in general and so has no specific objectives for addressing energy poverty (Swedish Ministry of Climate and Enterprise, 2024). The national policy framework for the energy transition in the Netherlands makes no mention of energy poverty. Using the European Energy Poverty Observatory (EPOV) high energy expenditure indicator for the Netherlands shows that around 11% of the Dutch population could be considered living in energy poverty (EPOV, 2021). While this percentage of the population is low compared to other EU countries, the two lowest income deciles make up 20% and 58% of the sample.



“The causes of energy poverty are more complex than lack of capacity to pay bills or invest in more energy efficient appliances.”

Gender plays a role in vulnerability to energy poverty. Households are complex, fluid and heterogeneous entities which is reflected in their energy use. Single mothers and their children are more likely than other households to live in houses in which the fabric of the building envelop has poor thermal qualities leading to poor energy efficiency. Older women who live alone are more vulnerable to energy poverty compared to men in the same age group due to differences in pensions exacerbated by their longer life expectancy. Technical competence, which is socially determined, influences who can find advice or financial support for addressing energy poverty which is commonly accessed via online sites. People without digital skills, a smartphone or a computer, as well as a stable internet connection, which tend to be older women, do not have the possibility to fill out online survey forms.

People actively reduce their energy consumption by a range of coping strategies such as heating only certain rooms in the house, switching the heating on for a limited number of hours each day, changing their sleeping hours and limiting visits from family members (Stojilovska et al., 2021). However, it appears that we may have a very limited understanding of who is living in energy poverty, indeed possibly underestimating the numbers, and their coping strategies. The Netherlands Environmental Assessment Agency (PBL) when trying to assess the level of household energy poverty found that they were unable to account for the living conditions of approximately 900,000 households (13% of the total) which was attributed to the nature of their residence (e.g., students, or people living in unusual dwellings, such as houseboats, or multi-occupancy dwellings) (PBL, 2018). While in Austria, the focus is exclusively on households with low incomes and high energy expenses which misses people who fall outside these categories (Eisfeld and Seebauer, 2022). For example, there are people who adopt behavioural changes to reduce their energy consumption to a level that matches their income but nevertheless are not able to enjoy a level of energy services to meet their requirements. High energy expenditure can also be linked to the building envelope’s energy efficiency which can be outside of the resident’s control and reliant on the landlord addressing the issue. There may also be other causes of high energy expenditure, for example, related to medical needs and, alternatively, reducing energy consumption can be a statement of commitment to environmental issues such as climate change. The lesson here is not to rely solely on numerical indicators but to combine them with qualitative indicators that provide explanation for the numerical data.

3. What we found

Policies have a tendency to be aspirational with a lack of clarity in objectives, indicators, approaches, techniques and methods for achieving those aims. For example, Sweden’s Energy and Climate Plan aims to become ‘the world’s first fossil fuel free welfare state’ without elaborating on the concept (Swedish Ministry of Climate and Enterprise, 2024, p. 4). While Austria puts “energy research and innovation at the heart of solving societal challenges” (Austrian Federal Ministry for Sustainability and Tourism, 2019, p. 51), there is



no identification of what those challenges are, nor is there any explanation as to how research can contribute to identifying or overcoming the challenges.

Policies related to the energy transition tend to have a technical focus with little attention to creating a socially inclusive and gender just transition. Where energy policy acknowledges the underrepresentation of women in policy formulation, the emphasis is on increasing the numbers, without outlining strategies to achieve this goal, and not recognising the contribution women can make to developing policy or reaching its objectives (Swedish Ministry of Climate and Enterprise, 2024, p. 2).

Energy policy documents show a lacking understanding of gender, failing to move beyond the gender binary and thereby making certain groups invisible.

For energy policy formulation there is limited gender disaggregated data and even less disaggregated across social groups. Energy policy documents show a lack of understanding of gender, using 'sex' and 'gender' interchangeably, some fail to go beyond the gender binary rendering people with other gender identities (e.g., non-binary or trans people) invisible, while some do not mention gender equality at all. There is a focus on vulnerable households or consumers without any attempt to disaggregate across social groups, although the Austrian *Regierungsprogramm* does identify some specific groups, such as children and seniors, suffering from energy poverty and the need to ensure that they are not excluded from social and cultural activities.

Within the energy transition energy poverty is generally framed as part of income poverty and so tends to be addressed within social policy. The causes of energy poverty are more complex than lack of capacity to pay bills or invest in more energy efficient appliances. A failure to act on improving energy efficiency can be due to a person undergoing a stressful experience, such as a bereavement, a divorce, illness, having to care for a family member with a physical or mental illness, which can distract from any requirement to act. This group of people can be considered 'hard to reach (HTR) users' which is a concept being increasingly used in the energy transition. The User-Centred Energy Systems (UsersTCP) defines hard to reach energy users as "any energy user from the residential and non-residential sectors, who uses any type of energy or fuel, and who is typically either hard-to-reach physically, underserved, or hard to engage or motivate in behaviour change, energy efficiency and demand-side interventions" (Mundaca, 2021, p. 2). The HTR category includes people whose income is more than sufficient to pay their energy bills which can make them less likely to change their behaviour in respect of reducing their energy use or investing in household energy systems, such as solar panels.

The evidence indicates that changing the behaviour of HTR users could have a significant effect on the energy transition (Stoddard et.al., 2021), which is increasingly recognised by policy makers, they appear not to be developing initiatives to specifically reach out to the groups within the HTR category, particularly the high income/high energy use group. See for



example Sweden's NECP (Swedish Ministry of Climate and Enterprise, 2024, pp. 75, 81, 173)

The governance landscape of the energy transition is becoming more complex, with policies being shaped by international commitments, such as the SDGs, as well as state and non-state actors operating at different levels, taking responsibility for delivering the transition with different functions and competences, in constant processes of negotiation, creating institutions and reallocating decision-making powers (Hooghe and Marks, 2003; Jeffery and Peterson, 2020). For countries within the European Union there is a supranational layer of governance involving the European Parliament and the European Commission which has an influence on national policies. For example, the European Parliament introduced legislation which legally obliges all Member States to develop a "set of criteria" for defining energy poverty, as well as assessing the number of households which meet these criteria and to develop objectives and policies to address the situation [(Regulation (EU), 2018/1999; Directive (EU), 2019/944); Commission Recommendation (EU) 2020/1563]. This makes a difficult situation for the Dutch Government, since as is pointed out above, at least at the time of writing, there is no official definition of energy poverty resulting in a lack of a national policy framework to address energy poverty which has led to a range of solutions across municipalities (BZKa, 2022; Harmsen, 2022). On the one hand these differences can lead to spatial injustices, while on the other hand the solutions can be tailor-made reflecting local and contextual factors (Feenstra et.al., 2021).

As was pointed out in section 2, current approaches to assessing the levels and nature of energy poverty are not giving a complete picture. For example, using an energy expenditure ratio as a measure of energy poverty runs the risk of not recognising households that are unable to access the level of energy services they would like.

So how do governments gain insights into energy poverty? A gender just energy policy would require a contribution from all stakeholder groups, not only people regarded as experts (such as energy engineers and social workers) but also 'ordinary citizens' particularly those living in energy poverty. When governments report on their consultations, it can be difficult to identify which groups actually contribute since respondents are listed in general categories such as social partners, civil society and the general public (Swedish Ministry of Climate and Enterprise, 2024, p. 10). A lack of more detailed specificity makes it difficult to gain a clear insight as to whether those consulted matched the diversity within Swedish society (Michael and Hultman, 2023). Research in the Netherlands and Austria shows that many of the people responsible for working with end-users do not understand the complexities of the social dimensions of energy poverty and so those in need of advice or assistance are being overlooked. A study in the Netherlands, interviewed workers in municipalities addressing energy poverty issues who indicated that at times there was a lack of capacity (Kreuger, 2023). In Austria, a course to train energy consultants on technical competence and know-how in energy-related matters, paid no attention to the social characteristics, such as gender, age and migration history, of the potential clients who would be the intended beneficiary of advice about improving energy efficiency in their homes (Hausner et al. 2023). As a consequence, people tend to be considered as passive recipients, with policies aimed at increasing their acceptance of solutions rather than encouraging their contribution to identifying solutions.



We identified two emerging issues related to the energy transition with distinct gender dimensions which raised gender justice concerns: jobs in the energy transition and energy communities.

3.1 Jobs for the boys

Many of the jobs within the energy transition will be in the construction sector. One estimate for the European Union's Green Deal gave the likelihood of two million jobs by the end of 2020, mostly in the construction industry (European Commission, 2019). However, women are under-represented in many of the trades within the construction sector such as metalworkers, insulation specialists, plumbers, pipefitters, electricians and heating and cooling experts (Clancy and Feenstra, 2019). In 2016, within the EU, women made up only 3% of employees in construction (Eurostat, 2016), a situation that has apparently not changed in more than 100 years (Clarke and Sahin-Dikmen, 2021). The barriers to women's participation are structural and organisational including recruitment practices, employment conditions such as long working hours (creating difficult work-life balance possibilities) and inappropriate equipment (Fielden et al., 2000; Clarke et al., 2015). The sector has a poor image as one with a misogynistic work culture (Norberg and Johansson, 2020). Such barriers not only stop women making a direct contribution to the green transition but also prevent them from building up good pensions which could have an impact on avoiding living in energy poverty later in life.

In respect of contributions to meeting SDG5, a paper prepared for the European Commission, stated that in order to achieve a minimum gender balance of 40% women¹ in the total energy sector workforce by 2050, would require nearly 200,000 additional jobs to be filled by women.

3.2 Energy communities

There are different ways in which citizens can play a role in the energy transition. Energy communities and prosumer households have emerged as one approach, however, social justice aspects can be undermined by the barriers to participation since a diverse range of citizens reflected in their gender, age, class, and ethnicity have insufficient funds to invest in membership or live in appropriate buildings. A study of 11 solar energy communities in Sweden, found that the boards, management teams and energy groups were dominated by men (Lazoroska et al., 2021). A cause for concern, particularly given Sweden's high score in the Gender Equality Rating, is that the interviewed board members did not recognise that their organisations were not gender justice. A qualitative study in the Netherlands found that women were reluctant to be involved in such initiatives. They gave two explanations: time poverty due to care commitments, or they did not have the technical knowledge to effectively participate (García Vázquez, 2016). Again, while national policies and plans recognise the contribution these organisations can make, there is lack of attention to redressing injustices. However, there are initiatives at lower levels of government to enable low-income households to be part of energy communities (see Section 4.1).

¹ This is based on a definition used by the European Institute of Gender Equality.

4. What needs to happen

To create a socially inclusive and gender just transition needs an understanding of the social system and the diversity in society which requires a contribution by social scientists to research about the energy system as is recognised in Sweden's ENCP.

To help create a more gender just and socially inclusive energy transition the Energy Ministry should carry out a Gender Impact Assessment and develop a gender action plan (GAP) for developing and implementing gender-responsive policies. GAPs are a recognised tool for implementing a gender mainstreaming strategy. A toolkit for political institutions to develop a gender mainstreaming strategy and GAPs has been developed by the European Institute for Gender Equality (EIGE, n.d; EIGE, 2016).

A gender-just energy policy needs input from all stakeholder groups, especially those facing energy poverty, to reflect diverse lived experiences.

Front line workers dealing with energy poverty in vulnerable households should have training in how to take a gender sensitive and socially aware approach starting by recognising that households are complex and without a 'standard user'. The nature of the training should ensure that energy advice is delivered in a manner that reflects differences in energy use, as well as competence in energy issues, which are differentiated by a range of social characteristics including gender, age, education level, cultural background, financial resources and motivation (Aggeli et al., 2022). The front-line workers should also reflect the social composition of the vulnerable households they are working with. Municipalities can play a role in influencing the social diversity of energy consultants by working with vocational training institutes not only to improve the diversity of intake but also to ensure that the content of courses includes both technical and social elements. This will ensure that municipalities receive more accurate information about the nature of energy poverty and lived experiences as well as enabling energy consultants to provide more targeted information and advice.

In respect of addressing motivation to address household energy efficiency, we recommend that responses to the energy transition should be shaped using the concept of HTR which helps reach out to people who are difficult to motivate to change their energy use behaviour.

Addressing energy poverty has multiple benefits such as improved health, job creation and meeting climate goals. This requires an integrated policy approach moving away from silo policy development to more aligned targets and responsibilities for example, housing, health and social welfare. A more nuanced understanding of the lived experiences of energy poverty can be obtained by using a framework with indicators that can identify both the causes and effects of energy poverty as well as reflecting its multidimensional nature by generating both quantitative and qualitative data (Trinomics, 2016; Clancy et al., 2017).



These indicators can help reach multiple overlapping policy objectives such as a reduction in emissions, increased living comfort and health benefits, for example, improved mental health through increased social interaction. The data should be presented in a manner that reflects the characteristics which are recognised as contributing to energy poverty vulnerability, including gender, age, migration background, disability, family size and housing status (tenant/owner). Disaggregation of data helps generate targeted solutions.

From an energy justice perspective, consultations about understanding and addressing energy poverty should involve not only people regarded as experts but also a range of 'ordinary citizens' who reflect the social composition of a country. A range of methods, such as surveys, think tanks, or workshops, are available to engage with the public who should be recognised as a repository of knowledge about lived experiences, such as energy poverty, and ideas about how to address this issue rather than as passive recipients of delivered solutions.

Given that many of the jobs in energy transition are expected to come in the construction sector there need to be initiatives to enable women to participate. Employers need to open up the construction sector for women's involvement and improve working conditions for men. First, by creating working conditions that support women such as providing flexible working hours and having more than one woman on a site. Second, by providing a supportive framework that can help women feel safe and secure through the provision of designated equality officers (who could also help support a more diverse workforce) and internal procedures to address grievances.

Municipalities can play a major role in diversifying the workforce both by creating the demand and ensuring a sufficiently diverse workforce is available. Improving the energy efficiency of buildings will involve a significant number of construction jobs. Municipalities are responsible for many buildings (such as social housing, care homes, schools, hostels, hospitals, museums and libraries) that will need upgrading in terms of energy efficiency so when initiating the work, they can lay down employment conditions for construction workers both in-house and through procurement. A condition of a contract should be that the company's terms of employment include family-friendly policies and working conditions (including providing equipment that is suitable for women). Municipalities can help generate a diverse workforce by liaising with vocational training institutes to ensure that their intake is diverse and offering apprenticeships, as well as reskilling and upskilling programmes, based on gender and diversity aware selection processes, as part of the renovation work. Liaising with women's organisations, professional bodies and unions can also help diversify the intake.

4.1 Good Practice

In this section we provide examples of good practices that contribute to a gender just/responsive and socially inclusive energy transition.

The **Equality in Energy Transitions Initiative** (2024) is a governmental network dealing with strategies, policies and measures to increase the promotion of women in the field of clean energy. Organised under the framework of both the Clean Energy Ministerial and the



Technology Collaboration Programme of the International Energy Agency, the initiative undertakes activities of awareness-raising, promotion and empowerment of women in the energy sector. The initiative also collects and exchanges qualitative and quantitative data on gender equality. There is an awards programme which aims to bring recognition to those advancing the transition to a low carbon economy by accelerating women's participation in clean energy generation and closing the gender gap in the energy sector (Equality in Energy Transitions Initiative, 2024).

Gender budgeting is a tool which emerged after the Beijing Platform for Action in 1995 to provide a mechanism for assessing the outputs and outcomes of government revenue and expenditure on women, men, girls and boys. A budget exercise consists of a range of activities aimed at analysing whether the government budget advances gender equality (Budlender, 2009). There is no consensus on the objectives of such an exercise (for example, a specific percentage allocation by all public bodies to gender equality programmes or a shift in allocation to disadvantaged groups such as people vulnerable to energy poverty). An analysis of gender budget exercises identified three general objectives: (i) raise awareness and understanding of gender issues and impacts of budgets and policies on those issues; (ii) make governments accountable for their budgetary policies and compliance with their commitments to the Beijing Platform for Action; and (iii) in line with those commitments, change and refine government budgets and policies to promote gender equality (Sharp, 2002). Gender budgeting is a legal requirement for all Ministries in Austria (EIGE n.d.). Officials receive training on how to develop equality outcomes, measures and indicators for their ministry's budgeting. Since the 2000s, the Swedish government has been practicing gender budgeting, ensuring that gender equality is integrated into the entire budget process. The government has introduced a five-step tool for gender budgeting (BUDGe), which is available to policymakers and public agencies. Sweden also implements gender-responsive budgeting in its international development cooperation.

The Covenant of Mayors for Climate and Energy Europe has recommended when addressing energy poverty to identify vulnerable groups based on a range of social characteristics including women and girls (Covenant of Mayors for Climate and Energy Europe, 2022).

In the national reviews of Beijing +25, 2019 (UN Women, n.d.), countries were required to detail their measures to recognize, reduce, and/or redistribute unpaid care and domestic work, primarily the responsibility of women, as well as promote work-family balance which form significant barriers to women joining the workforce and energy communities. All five Nordic countries have implemented or strengthened parental leave policies. For example, Finland's Ministry of Social Affairs and Health initiated the "It's Daddy Time" campaign, which focused on parental leave and aimed to encourage male-dominated industries to create more inclusive work environments for fathers. In Iceland, the Minister of Social Affairs and Gender Equality appointed an action group on men and equality with the mandate to develop proposals for integrating men into female-dominated sectors of the labour market, such as nursing and preschool education.

An example of energy justice for tenants comes from Sweden. Included in the rent is a guarantee that landlords must ensure that indoor temperatures in their apartments remain



between 20 and 23°C throughout the year, with a summer maximum at 26°C, and a winter minimum at 18°C. If the temperatures deviate outside of these values, the landlord must act to restore the ambient temperature. The tenant is entitled to a rent reduction for the period in which the indoor temperature diverges from the specified norm (Hyresgastforeningen, 2023). Another example of energy justice comes from Austria, where vulnerable groups can receive up to 100% subsidies for energy consulting and replacement/renovation of their heating systems (Hausner et al., 2023).

There are initiatives to enable low-income households to benefit from energy communities. To overcome the membership cost, the city of Eklo, Belgium, buys shares in an energy community and transfers the ownership to energy-poor households (Hanke et al., 2021). Deltawind, a wind energy cooperative of around 30 years standing in the Netherlands, is currently setting up a programme in the municipality of Goeree-Overflakkee to use some of their revenues to help alleviate energy poverty by working with residents and the municipality to make homes more sustainable (Breukers et al., 2023).

5. Flowchart - Pathway to gender-inclusive and socially just energy transition

Summarising Flowchart		
Identified Issues	Recommended Policy Action	Expected/Possible Outcomes
<p>Lack of Clear Definition for Energy Poverty:</p> <p><i>Varying definitions across the EU impact which groups are considered vulnerable.</i></p>	<p>Implement Gender Action Plans (GAPs):</p> <p><i>Develop and apply action plans to ensure policies consider gender-related aspects.</i></p>	<p>Reduce Energy Poverty:</p> <p><i>Reduced energy poverty for vulnerable groups through targeted support.</i></p>
<p>Gender Vulnerabilities:</p> <p><i>Women, especially single mothers and elderly women, are particularly affected by energy poverty.</i></p>	<p>Education and Training for Front Line Workers and Energy Consultants, in Social Inclusion and Gender Sensitivity:</p> <p><i>Ensure frontline workers are educated on social and gender differences in energy use.</i></p>	<p>Socially Inclusive and Just Energy Transition:</p> <p><i>An energy transition that reflects the diversity and intersectional needs of society.</i></p>
<p>Gender Imbalance in the Energy Sector Workforce:</p>	<p>Develop support for 'Hard-to-Reach' Groups:</p> <p><i>Adapt initiatives to reach HTR users, including high-</i></p>	<p>Increased Gender Equality in the Energy Sector:</p>



<p><i>Underrepresentation of women in technical roles and the construction sector.</i></p>	<p><i>risk and high-use groups, as well as high income groups.</i></p>	<p><i>A higher proportion of women in technical and construction roles</i></p>
<p>Lack of inclusive Energy Policy: <i>Energy transition policies often lack social and gender inclusivity.</i></p>	<p>Promote Gender Balance in Energy Sector Employment: <i>Open technical and construction roles to women by creating inclusive work environments and flexible working conditions.</i></p>	<p>Enhanced Citizen Engagement: <i>Citizens are involved as active participants rather than passive recipients of energy policy, strengthening the legitimacy and relevance of policy outcomes.</i></p>
<p>Missing/Lacking in Good Practices: <i>Effective good practices, such as gender-responsive budgeting or inclusive energy communities, are not consistently recognized. (GAP)</i></p>	<p>Integrate Good Practices in Policy Frameworks: <i>Incorporate proven practices, like gender budgeting, subsidies for low-income households and energy communities into national and local policies.</i></p>	<p>Widespread Adoption of Good Practices: <i>Policies consistently leverage successful practices, ensuring a more efficient and inclusive energy transition.</i></p>
<p>Call-to-Action: <i>To achieve a fair, gender-balanced, and socially inclusive energy transition, it is crucial to adopt proven good practices, foster gender inclusive and engage a diversity of voices across society.</i></p>		

The flowchart outlines key actions to address energy poverty, gender imbalances and exclusion, ensuring a socially just energy transition.



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FURTHER INFORMATION

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