

State of the Art

The complex and dynamic linkages between gender and energy are becoming apparent as the urgency of a successful energy transition becomes more evident. Despite the evidence that social values, norms, and practices directly impact policy developments, energy innovations and use, there is insufficient research as well as solutions addressing gender biases in energy. For decades, this connection has been overlooked due to stereotypical masculine models and discourses defining policies, economic approaches, and trading. Additionally, the multifaceted character of energy transition – its interdependence on technology and innovation, economic crisis, capacity building, and shift in governmental policies and approaches – has delayed investigating the social aspects such as gender equality, human rights, ethics, and equity (Terry, 2009). While some argue that energy and climate policies are gender-neutral, studies highlight that they are relatively gender-blind (Clancy & Roehr, 2003; Khamati-Njenga & Clancy, 2002). Science-based evidence and knowledge are vital to identifying gender barriers and gaps, implementing effective interventions, and advising inclusive energy policies. Therefore, this piece brings the findings of German-speaking scholars into dialogue with each other and connects them with our case studies on gender and energy.

The international literature research suggests that the number of publications examining energy or energy policy through a gender lens are low. Our efforts proved that this number is considerably lower if one looks at studies that are in German, focused on German-speaking countries, or affiliated with German-speaking research centers and universities. Most of our findings are focused on Germany. The topics include but are not limited to energy communities, citizen participation, energy literacy, energy and energy justice which can all together be categorized under energy policy and legislation. It is notable that compared to international studies, gender and energy are mainly discussed within the framework of climate change and environmental problems/obligations than a stand-alone topic.

Engendering Energy Policy

Experts in the field of energy and climate change policies argue that gender equity and equality – often mentioned as gender justice – must become an integral part of policymaking (Alber et al., 2018; Alber et al., 2021; Hemmati & Röhr, 2009). Therefore, gender mainstreaming in policy development should be widely exercised on national and international levels. This practice improves the economic, technological, social, and legislative energy instruments, mechanisms, and solutions by diversifying the voices, needs, and perspectives of the underrepresented groups and reflecting on the long-term implications of energy policies for these groups. Gender mainstreaming is needed in all aspects of the energy, namely, the production, distribution, consumption, research and innovation, and funding.

Scholars have observed that the persistent participation of women, gender activists, NGOs and civil society in the United Nations Framework Convention on Climate Change (UNFCCC) has shifted the focus from market growth and technology development to caring and justice. Their efforts have injected the gender perspective into the heart of international climate change agreements and commitments (Alber et al., 2018; Alber et al., 2021; Hemmati & Röhr, 2009). Nevertheless, looking at the national implementation of such commitments has proven to be difficult. Case studies on Germany discover that mainstreaming gender into climate policy in Germany is still a challenge – identifying the institutional resistance is the most crucial factor. To overcome it, they suggest that further actions to politically change certain traditions of addressing gender and involving ministries and bodies in charge of gender equality (gender

machinery) must be taken. Additionally, power structures within governmental institutions must be monitored and revised (Alber et al., 2018; Alber et al., 2021).

In one of her studies, Cornelia Fraune (2016) draws a comparison between Germany and the United States of America. Focusing on gendered legislating and energy policy-making. Gathering data from roll call votes and some political debates concerning energy policy initiatives since 1992 to 2011, Fraune investigates gendered behaviors and attitudes of legislators. This study demonstrates that energy attitudes and priorities are not only gendered on the individual and domestic level, but also on the parliamentary level. Women's daily practices and lived experiences, particularly with regards to energy use, are captured and represented better by female legislators and the difference is evident. Moreover, the author illustrates that gender differences even have a role in the definition of which issues are relevant for women and their preferences.

To help the civil servants working for governmental bodies (also at the regional level) and ministries evaluate the gender implications of the legislation, policies, and programs, the European Commission introduced the Gender Impact Assessment (GIA) toolkit (Gender Impact Assessment, n.d.). Yet, the implementation of gender-criteria has been somewhat unsuccessful. Certainly, the first barrier is the necessity of involving gender experts in the policy area. However, Alber et al. (2021) also recognize that GIA needs to be followed up even after a policy is implemented. To assess its effectiveness, sex-disaggregated data collection and evidence are required. Thus, they recommend a methodological reformation that would allow for such practices.

The research by Radtke and Ohlhorst (2021) can serve as an example of why understanding gender criteria is significant in the energy transition and harnessing all the available talent and voices. The authors argue that Germany was one of the most prominent countries in the energy democracy field. However, due to a change in the funding policies in 2014 – delegating the financial incentives supporting the citizen-driven energy transformation from the governmental sphere to the auctioned citizen projects – the German government has fallen behind. The reformed policy was misused and later cancelled. However, since then, the government has failed to implement a new policy addressing bottom-up energy transition initiatives.

Looking at the community energy projects in Germany, the authors learn that diversity within these projects is extremely low. Women and the youth are especially underrepresented, and their involvement is mostly seen in (voluntary) administrative tasks than decision-makings. The majority of the members are academics with a high level of income who actively participate in the initiative and meetings. Radtke and Ohlhorst (2021) conclude that community energy projects can contribute to a just transition and thus, the improvement of energy democracy. They offer an opportunity for the engagement of diverse groups of citizens, different in age, gender, income and educational level, and their bottom-up participation in the energy transition. However, it is crucial to note that citizens' participation in the projects would not lead to a just transition on its own. Instead, it is necessary that the right policy framework that encourages, facilitates, and supports diversity within community energy projects is devised and implemented.

Another research in Germany by Radtke et al. (2022) supports the idea that community energy is helpful for local and decentralized energy transition. More significantly, it encourages pro-environmental influence on sustainable behavior. Nevertheless, the benefits are not equally shared with the population. People with higher capital (higher income and interest) are less likely to change their behavior. So, policies should become more responsive to social structures.

On the other hand, understanding gender inequalities and biases are tremendously effective when policies and regulations are developed. For instance, K.L. van den Broek (2019) investigates the concept of energy literacy. The author shows that a low level of energy understanding has been recorded by the scientists among the general public. Additionally, among different types of energy literacy, action energy literacy (awareness of energy saving actions/management as well as the accuracy of the actions taken) seems to have the most impact on energy behaviors. Thus, to change citizens' energy behavior, policy makers should attempt to raise energy literacy of households that is tailored to contextual differences (culture, religious beliefs, etc.) and aligned with science-based estimation of biases and heuristics.

Drawing on the contextual and cultural aspects of policy development, Swim and Becker (2012) shed light on how individuals' behavior and perception vary between students in Germany and the United States of America. The authors indicate that in line with country level differences in mitigation efforts, German students are more likely to engage in direct and indirect energy reduction behaviors. Their suggested model explains the relation between country and likelihood of engaging in these behaviors, meaning Germans show more energy reduction behaviors because they are more likely to endorse biospheric environmental concerns, less likely to endorse egoistic environmental concerns, less likely to think that personal costs of energy reduction behaviors are important, and more likely to think ethical considerations are important.

Shifting focus to gendered inequality in the energy domain, Smetschka et al. (2019) examine the carbon footprint of the daily activities of women and men in Austria via a time-use survey. Their study confirms the existence of traditional gendered divisions of tasks and demonstrates that women tend to dedicate more hours to caring and household, and therefore their CO2 emission is perceived as higher. While the policies focus on the high numbers and change in women's energy behaviors, the authors point out that women's activities are for the whole household. Therefore, these calculations and models should be methodologically questioned. Smetschka et al. (2019) argue that policies based on time use must follow a functional approach which contributes to the inclusivity perspective.

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