

The role of women's networks in the German energy transformation

BACHELOR THESIS

by

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Abstract

In light of the ever-more present climate crisis and increased efforts to decarbonize the energy sector, it is important to pay attention to the intersection of gender and energy, that feminist energy literature describes, in order to create a truly sustainable energy system. One proposed tool to enhance women's participation are women's networks, however, literature on their work and impact remains limited. This thesis thus aims to analyse the role of women's networks in the German energy transformation.

For this purpose, the following research questions were developed: **1.1.** Which women's networks are active in the German energy sector?; **1.2.** How do those women's networks function?; **1.3.** What are they working for?; **1.4.** Do they have an impact on the German energy transformation? And if yes, which impact do they have and how do they achieve it?

To answer those questions a content structuring qualitative content analysis was applied to data collected from the websites of selected women's networks and from five semi-structured interviews. Results revealed that the fourteen identified women's networks collectively achieved their main impact on the energy transformation indirectly through their members and by increasing the share of women in the sector. Through a variety of tools, women's networks challenge stereotypes and traditional gender roles, achieving an impact beyond the realm of the energy workforce.

More research is needed to assess how important their influence is and which individual networks and specific tools are most impactful.

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Abbreviations

BEE	Bundesverband Erneuerbare Energien (Federal Association for Renewable Energy)
BMU	Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit (Federal Ministry for the Environment, Nature Conservation and Nuclear Security)
BMWK	Bundesministerium für Wirtschaft und Klimaschutz (Federal Ministry for Economic Affairs and Climate Action)
COP	Conference of the Parties
DGMK	Deutsche Wissenschaftliche Gesellschaft für nachhaltige Energieträger, Mobilität und Kohlenstoffkreisläufe (German Scientific Society for Sustainable Energy, Mobility and Carbon Cycles)
dib*	Deutscher Ingenieurinnenbund (German Association of female engineers)
EIGE	European Institute for Gender Equality
FINTA	Female, intersex, non-binary, transgender and agender
FTA*	Femtec Alumnae
GHG	Greenhouse gases
GWNET*	Global Women's Network for the Energy Transition
IASS	Institute for Advanced Sustainability Studies
ILO	International Labour Organization
INWES*	International Network of Women Scientists and Engineers
IPCC	Intergovernmental Panel on Climate Change
IRENA	International Renewable Energy Agency
PwC	PricewaterhouseCoopers GmbH

RE	Renewable energy
SDG	Sustainable Development Goal
STEM	Science, technology, engineering and mathematics
UBA	Umwelt Bundesamt
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
VDE	Verband der Elektrotechnik Elektronik Informationstechnik (Association for Electrotechnology, Electronics, Information Technology)
WEC*	Women’s Energy Council
WiT*	Women in Tech
WMO	World Meteorological Organization
wom.e.n.*	Women Energy Network
w.one*	Women of New Energies

* *Women’s networks*

Introduction

In 2023 the climate crisis was omnipresent in the media through extreme events, scientific findings, and political declarations: The hottest year on record saw many extreme events, including Mocha, one of the most intense tropical cyclones of all times, the largest ever recorded wildfire of Europe in Greece, and extreme rainfalls leading to catastrophic floodings in Italy and Libya (WMO, 2023). The 6th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) published in 2023 clearly stated that “[h]uman activities, principally through emissions of greenhouse gases, have unequivocally caused global warming [... which] is already affecting many weather and climate extremes in every region across the globe” (Calvin et al., 2023, p. 42). The report served as the basis for the 28th Conference of the Parties (COP) in Dubai, which concluded in its final declaration that countries should contribute to the global effort of “[t]ransitioning away from fossil fuels in energy systems [...]” (First Global Stocktake, 2023). This sentence, which was the subject of heated debate among participants before they agreed on this wording, was described as historic by the media because, for the very first time, fossil fuels were named and shamed for the climate crisis in a document signed by all UN member states (Morton, 2023). The United Nation’s (UN) Climate Change Executive Secretary Simon Stiell called it “[...] ‘the beginning of the end’ of the fossil fuel era” (UNFCCC, 2023).

This poses questions about the future of our energy system, which are controversially discussed in science, politics, and civil society. Feminist energy literature depicts energy systems as systems of power embedded in a larger societal context, which is illustrated by the term socio-technical systems (Bell et al., 2020; Fraune, 2015; Mang-Benza, 2021). In this sense, Mang-Benza points out that “[e]nergy systems are social systems and energy technologies do not dictate the direction of energy transitions” (Mang-Benza, 2021, p. 7). ‘Transitioning away’ from fossil fuels is certainly important, given that the energy sector accounted for 73% of all global greenhouse gas emissions (GHG) in 2017 (Friedrich et al., 2020). However, the

decarbonisation of the sector is only one aspect of the energy transformation, and social scientists criticise that more attention should be paid to its social dimension (Johnson et al., 2020; Schmid et al., 2015). More specifically, feminists argue that the intersection of gender and current challenges we face, like, the climate crisis, has not been sufficiently acknowledged and studied in Western media and science (Adams et al., 2020; Mies & Shiva, 2022).

To underline that this thesis analyses the societal transformation that is required for and shaped by the transition from fossil fuels to renewable energies (RE), the term energy transformation will be chosen over the expression energy transition, following the interpretation of Frauen (2015). The importance of the social dimension of the energy transformation is evoked in the continuation of the historic sentence from the final declaration of COP28, which reads in full: “[t]ransitioning away from fossil fuels in energy systems, in a just, orderly and equitable manner, accelerating action in this critical decade, so as to achieve net zero by 2050 in keeping with the science ” (First Global Stocktake, 2023, art. 28).

According to an analysis published by Women Engage for a Common Future, this energy transformation should focus on a redistribution of power and opportunities for action (Kuschan et al., 2020). This connects to an ecofeminist understanding that “sustainable development [...] relies on challenging unjust power relations in a strive for equality, access, and social justice“ (Odrawaz-Coates, 2021, p. 10). RE systems are not automatically more democratic, just, or inclusive (Bell et al., 2020; Johnson et al., 2020; Mang-Benza, 2021), i.e., they are not inherently sustainable, if sustainability is understood as the intersection of social, economic, and environmental sustainability (Rosen, 2020). Bell et al. (2020) even question the assumption that a change in the source of energy would be ecologically sustainable, in so far as they suggest that the degradation of nature will continue as long as the current paradigm of eternal economic growth persists. Ecofeminists like Vandana Shiva and Maria Mies (2022) see the current patriarchal, capitalist system not only as the root cause of the destruction of nature but also of the oppression and exploitation of women and the Global South by the Global North. In this

sense, Miller et al. (2015, p. 30 as cited in Mang-Benza, 2021) define a true energy transformation as a change of “not only the technologies and economics of energy but also physical and social geographies, social meanings, and the political organization of energy production, distribution, and consumption”. Such a fundamental change would represent an opportunity “to put the concerns of those most exploited – women, people of color, and the global 99 percent – at the core of energy transition politics” (Wilson, 2018). RE have a true potential for transformation and sustainability because, as opposed to fossil fuels, they can be used in a decentralised manner by a variety of actors (Allen et al., 2019) and their subtractability is low, i.e., the amount of, e.g., sunlight or wind is not reduced for everyone simply because someone uses it to produce energy (Verrax, 2019). However, in order to realise the potential of RE, attention must be paid to the broader social aspects of the energy transformation (Miller et al., 2015) and diverse stakeholders need to be included (Pearl-Martinez & Stephens, 2016). According to Pearl-Martinez & Stephens (2016, p. 12) “[a]mong those stakeholders actively involved in the energy-system transition, gender is one critical factor influencing framings and articulations of appropriate responses to climate-energy challenges”.

Gender is such an important aspect because, firstly, the underrepresentation of women represents an unrealised opportunity in so far as the (renewable) energy industry requires skilled workers for surviving and expanding and training and requiring more women could contribute to overcoming current and arising skill shortages through enlarging the talent pool (Clancy & Feenstra, 2019; Clancy & Roehr, 2003; IRENA, 2019). Secondly, including women brings a variety of co-benefits, which Pearl-Martinez & Stephens (Pearl-Martinez & Stephens, 2016, p. 13) summarise as follows: “paying attention to women’s interests and needs and recognizing new opportunities for women in energy would simultaneously provide economic, environmental, and technological benefits while encouraging energy-sector innovation”. In fact, studies show that a better gender balance improves the overall working environment for all, enhances creativity and innovation and boosts the economic performance of companies

(Carroll, 2022; Chaumont et al., 2021; Emmons Allison et al., 2019; IRENA, 2019; Johnson et al., 2020; Pearl-Martinez & Stephens, 2016). As women also represent an increasing share of RE customers, hiring women becomes even more attractive because female employees may be better able to understand those customers and sell them products (Emmons Allison et al., 2019). Regardless of the benefits for the energy sector of advancing women, “women and men should, on the basis of equity, have equal opportunities not only to make use of energy but also to be able to participate in making choices about energy both at the policy level and in their own lives“ (Clancy & Roehr, 2003, p. 48). In this spirit, the International Renewable Energy Agency (IRENA, 2019, p. 19) calls it “a matter of basic fairness to adopt policies, programmes and rules for equal job and career opportunities”. Gender equality and the involvement of women in the energy sector are also inherent parts of sustainability: The United Nations’ Agenda 2030 not only includes a specific target, namely Sustainable Development Goal (SDG) 5, on gender equality and the empowerment of women, but also acknowledges that this specific goal will contribute to achieving other SDGs and that “[t]he systematic mainstreaming of a gender perspective in the implementation of the Agenda is crucial” (Agenda 2030, 2015, art. 20). Gender equality is also included in the Paris Agreement, which reads, “[p]arties should, when taking action to address climate change, respect, promote and consider their respective obligations on human rights.... as well as gender equality, empowerment of women and intergenerational equity” (Paris Agreement, 2015, p. 1).

But while the climate crisis is omnipresent through extreme events, scientific studies, and political agreements, pushing the climate-energy nexus to the forefront, the gender-energy nexus is only starting to get recognized and still gets limited attention. EU policies like the Green Deal or Clean Energy do not mention gender (Carroll, 2022) nor does the German National Energy and Climate Plan (Grönefeld, 2022). Furthermore, authors point out that most existing scientific studies regarding energy and gender focus on questions of energy access in the Global South, leading to a lack of data for the Global North (Clancy & Feenstra, 2019;

Clancy & Roehr, 2003; Johnson et al., 2020; Pearl-Martinez & Stephens, 2016; Standal et al., 2020). This creates a vicious cycle: little attention is paid to gender because limited data exists, and because of this low interest, only little data is collected (Clancy & Feenstra, 2019). How may this cycle be broken? One commonly named tool to enhance gender equality in energy, especially in terms of gender-balance within the energy workforce, are women's networks, with some of such networks even publishing studies on gender and energy (Clancy & Feenstra, 2019; GWNET, 2019; IRENA, 2019). However, the existing literature, which will be discussed in more depth in the literature overview (see Women's networks), does usually not elaborate on how exactly such networks function or what impact they have. In times of an ever more present climate crisis and increasing efforts to transform the energy system, it thus seems urgent to have a closer look at existing women's networks and understand how they operate and how they impact the energy system. In this work, the German energy transformation was selected as the research context because of the country's leading economic and political role within the EU and in the global effort to transform energy systems (Ferris, 2022; Jungjohann & Morris, 2014; Pallavi, 2023).

Research question

To guide the research, the following questions were formulated:

1. What is the role of women's networks in the German energy transformation?
 - 1.1. Which women's networks are active in the German energy sector?
 - 1.2. How do those women's networks function?
 - 1.3. What are they working for?
 - 1.4. Do they have an impact on the German energy transformation? And if yes, which impact do they have and how do they achieve it?

Literature overview

In this chapter, the gender-energy nexus mentioned in the introduction will be explored in more depth, with an explicit focus on the topic of women's networks, before the context of the German energy transformation will be described.

Gender

Fathallah und Pyakurel (2020) point out that many 'gendered energy studies' are unclear in their terminology. Before diving deeper into the literature, it should thus be highlighted that in this work, the term gender is understood as "the socially constructed and acquired roles, behaviours, and expectations associated with men and women" (Mang-Benza, 2021, p. 1). Gender roles are learnt through socialisation, and they vary within and between different societies and over time; they are not biological (Clancy & Roehr, 2003). Different genders, exceeding the binary man-woman, exist (Fathallah & Pyakurel, 2020). Whenever the term 'women' is used, it refers to the constructed gender role, not the sex of people, unless stated differently; because, as will be discussed shortly, social and cultural norms are a key factor keeping women from fully participating in energy topics (see e.g. Baruah, 2017; Clancy & Feenstra, 2019; IRENA, 2019). Women was selected over the more inclusive term FINTA (female, intersex, non-binary, transgender and agender) because the cited scientific studies as well as all of the identified women's networks use the former. Fathallah und Pyakurel (2020) warn that a simplistic, binary use of gender may bolster preconceived 'gender myths'. Nevertheless, it seems important to study the specific experiences which women have with energy while acknowledging that they are not a homogenous group and that gender is only one of many dimensions of the identities of people (Bögel et al., 2023; Fathallah & Pyakurel, 2020).

Gender-energy nexus

As mentioned above, women's networks are presented as a tool for gender equality within energy, but before discussing them in more detail, it is important to understand why they may be needed.

Literature on the gender-energy nexus in the Global North is slowly increasing, revealing many intersections (Johnson et al., 2020): In terms of energy consumption, one quarter of the energy produced within the EU is used for daily household tasks, which are still disproportionately carried out by women (Carroll, 2022). And women, especially single mothers and elderly women, are more prone to energy poverty than men (Carroll, 2022; Clancy & Feenstra, 2019). Although energy is available in the EU and citizens are connected to an energy grid and thus have access to energy from a technical point of view, that does not necessarily mean that they can afford it (Clancy & Feenstra, 2019; Papadimitriou et al., 2023), illustrating again the importance of the social dimension. Within the EU, on average, women still earned 12.7% less than men in 2021 (*The Gender Pay Gap Situation in the EU*, n.d.) and in Germany, women accumulate on average only 72% of the wealth of the average man (Fraune, 2015). The gender pay and gender wealth gaps do not only make women more vulnerable to energy poverty (Clancy & Feenstra, 2019), they also translate into a decision-making gap through the fact that women hold fewer shares in German citizen energy initiatives (Fraune, 2015). Indeed, also in the production of energy, an important gender imbalance can be observed, both within citizen initiatives and the energy industry. Standal et al. (2020) found that within the studied households in the UK and Norway, the decision to install a PV system and its maintenance was mostly the responsibility of the men. They summarised that “[w]omen tend to have less of the economic, cultural and social capitals needed to become prosumers, whereas men are more often associated with the cultural and symbolic capitals which frames technology as largely a male domain” (Standal et al., 2020, p. 8).

The perception of gender roles is also the main barrier for women to enter the energy sector's workforce (Baruah, 2018; Clancy & Feenstra, 2019; IRENA, 2019). Given that networks are mentioned mostly in studies focusing on employment, this dimension will be analysed in more detail: In fact, "[...] 'mining of coal and lignite' is the lowest performing sector in terms of gender equality in the EU across all sectors classified in NACE Rev 2"(Chaumont et al., 2021, p. 11). Reliable and consistent gender-disaggregated data is still rarely found (Clancy & Feenstra, 2019), but according to a labour force study, 80% of the workers in the EU energy sector in 2020 were men (Chaumont et al., 2021). On a global level, a survey by IRENA (2019) revealed that women represent about 32% of employees in the renewable energy sector compared to 22% in the oil and gas sector and a 45.9% economy-wide average (IRENA, 2019). Why the RE sector performs better is still being debated: In the foreword to the IRENA study, Rabia Ferroukhi argues that it is due to "[...] the more holistic, democratised energy future they represent" (IRENA, 2019, p. 7). This idea is supported by the fact that 61% of interviewed Canadian and US-American female workers indicated that they decided to work in the renewable energy sector primarily for environmental concerns (Emmons Allison et al., 2019). Clancy & Feenstra (2019) however, observe that the higher share of women in the renewable sector may be linked to the fact that green issues are important for young people regardless of their gender. Indeed, the share of young women is higher in renewables than fossil fuels, according to the study by IRENA. Within the EU, the share of women working in the energy sector is higher for workers aged 25-49 than for those aged 50-74 (Chaumont et al., 2021). Lucas et al. (2018) also point out that professional networks in the oil and gas sector have existed for a longer time and continue to be dominated by men, while networks in the RE sector are younger and more welcoming to female members, and those networks in turn potentially attract more women to the sector.

Besides the distinction between renewable and non-renewable energy and age, differences in gender balance can also be observed according to the region, work hours, fields of work, and rank: Northern and Western EU member states perform better than Southern and Eastern member states and the share of women is higher for part-time employment than full-time employment (Chaumont et al., 2021). On the contrary, the number of women is particularly low in technical fields (Clancy & Feenstra, 2019). According to IRENA's online study, women occupy 28% of STEM (science, technology, engineering and mathematics) and 35% of non-STEM technical jobs, compared to 45% of administrative jobs within the renewable energy sector (IRENA, 2019). This is linked to the educational backgrounds of women and inherent social biases, which in turn are also interconnected (IRENA, 2019; UNESCO, 2017). In 2022, only 36% of STEM graduates in the EU were women (Carroll, 2022) and in Germany, only 21% of engineering students were female in 2011 (Baruah, 2017). STEM is often depicted as a masculine topic, so women's confidence and interest in it are discouraged from a very young age on (IRENA, 2019; UNESCO, 2017). The problem is that those "[g]ender imbalances among STEM students carry through to gender imbalances in STEM jobs – in the renewable energy sector as elsewhere" (IRENA, 2019, p. 34). The situation is further aggravated by the fact that half of all female STEM graduates leave the field within the first decade after graduation because of an unsupportive work environment and a feeling of isolation, which could be counterbalanced by women's networks (Pearl-Martinez & Stephens, 2016).

In addition to university studies, apprenticeships are important entry points into the energy sector, but again, women are extremely underrepresented among apprentices (Carroll, 2022; IRENA, 2019). This is partially because apprenticeships are often informally promoted and assigned through networks that women can only difficultly access (Carroll, 2022; IRENA, 2019). For women, it is also particularly difficult and uncommon to access high-ranking positions within energy companies or in the public sector (Bray et al., 2022; Clancy & Feenstra,

2019; EIGE, 2023; IRENA, 2019). In 2016, only 6% of ministerial positions responsible for national energy policies and programs (Clancy & Feenstra, 2019) and 5% of executive board members in the world's largest utilities were women (IRENA, 2019). Chaumont et al. (2021, p. 17) further highlight that “[d]ata shows that fewer women reach senior roles in the energy sector than in the broader economy, with notable variations between sectors”, which according to them, reinforces the gender gap within the sector. Indeed, 75% of women perceive the existence of gender-related barriers in the energy sector, while only 40% of men seem aware (IRENA, 2019) and “sex roles are more stereotypical and more problematic in firms with relatively low proportions of senior women” (Ely, 1995, p. 589). According to IRENA's extensive study of gender dimensions of the RE sector, the so-called glass ceiling represents the primary hurdle to keeping and advancing women professionally in the energy sector (IRENA, 2019). Another aspect is the difficulty in achieving a good work-life balance due to rigid schedules and the necessity to travel and/or relocate in certain positions (EIGE, 2023; IRENA, 2019).

As mentioned above, in terms of entering the sector, IRENA (2019) identifies perceived gender roles as the main barrier, which is closely linked to the second hurdle, social and cultural norms. Both, in turn, influence the third challenge, hiring practices (IRENA, 2019): Women tend to only apply to jobs if they fulfil all the criteria (Carroll, 2022) and they often don't even learn about career possibilities in energy because they are excluded from male-dominated networks that informally share information about them (Emmons Allison et al., 2019; IRENA, 2019). IRENA (2019) describes the discrimination of women in the hiring process as a typical ‘chicken and egg’ problem, explaining that “women often lack the necessary training and skills for many jobs, but these jobs had traditionally not been designed with women in mind and are therefore not particularly attractive to them, resulting in a smaller pool. Thus, when it comes to selection, managers, who are much more likely to be men, are less likely to regard women as suitable

candidates” (IRENA, 2019, p. 37). In its study, IRENA (2019) also highlights the misconception that a STEM education is mandatory to enter the energy workforce. Further hurdles to female participation identified in the literature are missing childcare facilities and gender targets, the fear of sexual harassment, and a lack of support and role models (Baruah, 2017; P. Carroll, 2022; EIGE, 2017; Emmons Allison et al., 2019; IRENA, 2019).

From the existing literature, Emmons Allison et al. deduce that overcoming the gender imbalance in the energy workforce “[...] will require correcting misperceptions about the renewables sector and women’s roles in it, increasing women’s interests in technical education and training as well as improving their access to it, and providing the workplace and career flexibility women and others with care-taking responsibilities require for professional success” (Emmons Allison et al., 2019, p. 37). More specifically, it is recommended to raise gender awareness (IRENA 2022), including through introducing trainings for gender awareness, gender audits, and gender targets and quotas (GWNET, 2019; IRENA, 2019). Based on the observation by Anand Mahindra, an Indian businessman, that “[...] when you have a woman CEO in the company, miraculously, that pool emerges, and you get more women” (Alves, 2018), IRENA (2019) suggests to ‘simply’ hire more women, but also to introduce gendered energy policies. Today, energy policies are usually considered gender-neutral, but given that they do in fact impact genders differently, as elaborated above, they are actually gender-blind (Clancy & Feenstra, 2019). Another key demand is an increasing recruitment of women to STEM (GWNET, 2019; Standal et al., 2020). This requires visibility of women in and from the sector, which is already pursued in different campaigns throughout the EU and beyond (Clancy & Feenstra, 2019; IRENA, 2019). Additionally, authors propose targeted scholarships, internships, and enrolment targets, as well as the adaptation of university curricula (IRENA, 2019). On the one hand, programmes should become more ‘women-friendly’ e.g., by putting more emphasis on group work, which women prefer according to different studies (Clancy &

Feenstra, 2019) and on the other hand, they should be better aligned with the skills required in the energy sector (Lucas et al., 2018). Bray et al. (2022) also suggest including ‘green education’ in lower and higher education. Besides, researchers state that it should be communicated that a STEM background is not mandatory to work in the field, and people from fields like law, business, and environmental sciences should also be considered when hiring (Emmons Allison et al., 2019; IRENA, 2019). In general, IRENA (2019) urges to promote job openings more broadly and more transparently. An increased transparency is also important in terms of promotions, employees’ salaries, and company-level targets (Clancy & Feenstra, 2019; GWNET, 2019; Pearl-Martinez & Stephens, 2016). This is where the company leaders are called upon (Clancy & Feenstra, 2019; Pearl-Martinez & Stephens, 2016). For women to stay in the field, besides the work environment, a better work-life balance is key (GWNET, 2019; IRENA, 2019). To achieve it, part-time or flexi-time employment and support for employees with care-responsibilities like paid parental leave for both parents and childcare facilities should be introduced (IRENA, 2019) Additionally, “mentoring and networking is creating a stimulating peer-learning environment and a supporting community for women in the energy sector” (Clancy & Feenstra, 2019, p. 40).

Women’s networks

In fact, women’s networks are mentioned as a tool to improve gender balance in many papers (see e.g. Emmons Allison et al., 2019; IRENA, 2019; Mang-Benza, 2021). They are considered instrumental for making women feel and be less alone, creating learning opportunities, and providing support (Clancy & Feenstra, 2019; Pearl-Martinez & Stephens, 2016). Czako (2020) describes women’s networks as instrumental in overcoming the above-described entry and career hurdles and thus for the attraction and retention of women in her report on the energy workforce. She argues that “[t]hey do so by offering platforms to exchange experience,

structured mentoring activities and trainings, as well as study visits to energy infrastructure installations and energy companies” (Czako, 2020, p. 41).

However, very few studies exist that focus explicitly on women’s networks and their impact: Emmons Allison et al. (2019) analysed through feminist ethnographic methods which women are working in the US American and Canadian energy sectors, how they got there, and how gender and networks influenced their trajectories. They highlight that networking in general is important, but that “[...] women may find it uncomfortable, at best, to integrate existing networks initially organized by and for men, and cemented by activities - from golf and sports pools to gendered trash talk - they find alienating or offensive” (Emmons Allison et al., 2019, p. 37) and that, different from men, they seek more profound relationships and offers like mentoring and education within networks. Traditional networks also seem to benefit men with regards to their career advancement and salary negotiations, but not women; which could be linked to their care responsibilities, a lack of access to high-level leaders, and their fear of being perceived as pushy, when acting assertively (Emmons Allison et al., 2019; Hyder, 2017). Emmons Allison et al. (2019) revealed that within women’s networks, women are, on the contrary, applauded for ‘being bold’. They recounted that “[r]espondents did characterize networking events as spaces where women could ‘commiserate and feel as if they are not alone’ and opportunities for women ‘to help each other out based on experience’ ” (Emmons Allison et al., 2019, p. 40). The interviewed women felt that the networks benefitted them personally, including to advance their careers, and women in the sector in general, with “[o]ne of the executives we interviewed explained that education and hard work are not enough; women’s networking is critical in the industry because ‘it’s about how people see you...Maybe men are coached on this’” (Emmons Allison et al., 2019, p. 40). Women’s networks also showcase the achievements of individual women through the award that some of them introduced (IRENA, 2019). However, interviewed women’s networks members also see a risk of women’s networks

being perceived as places where women come together to only complain about men and of demands on work-life balance stabilising the gender pay gap (Emmons Allison et al., 2019). In terms of advancement of all women in the sector, “[...] women’s networking organizations [...] are engaged directly in the work of dismantling exclusionary professional networks and the other informal barriers women face, once the education and training and work-life balance obstacles have been addressed” (Emmons Allison et al., 2019, p. 37).

Which women’s networks are active in Germany, was analysed in three publications by the PricewaterhouseCoopers GmbH (PwC), an auditing company, which also founded a women’s network itself (PwC, n.d.). The focus of their work was on women’s employment in the sector especially in executive roles, but they also determined that the number of women’s networks increased from fifteen to twenty between 2014 and 2021 and the first study included a list with the names of the identified networks (PwC, 2014, 2018, 2022). The auditing company sees those networks as a possibility for women to establish professional relationships across companies, advance their careers, and access leadership positions, as well as to promote the energy sector itself (PwC 2022).

Research context: Germany

Because literature on the gender-energy nexus usually focuses on the Global South (Pearl-Martinez & Stephens, 2016; Standal et al., 2020), this work should focus on a country in the Global North. Germany was specifically chosen because of its position within the EU and its leadership role in RE: With its roughly 84 million inhabitants, Germany is the largest country within the EU in terms of population (eurostat, 2023) and it accounts for almost a quarter of the total economy of the union (Pallavi, 2023). In 2020, Germany hosted 82 of the 217 wind and 53 of the 138 solar manufacturing sites of the EU, earning it the title of “Europe’s industrial powerhouse” (Ferris, 2022) and creating employment within the country. The German RE sector offered 352,000 jobs in 2021, making it the second largest employer for wind energy,

eighth for solar energy, and tenth for liquid biofuel worldwide (IRENA & ILO, 2022). Germany's leadership role in RE is also illustrated by the fact that the German word "Energiewende" is not only known internationally but even commonly used in English nowadays (Jungjohann & Morris, 2014; Kemfert, 2016). The term 'Energiewende' was used and interpreted by various actors in different ways (Evans, 2016; Öko-Institut e.V., n.d.-a), showing again how technical and social aspects of energy systems are interwoven through political discussions and societal values.

The current government, in power since 2021, made climate action one of their main priorities (Bündnis 90/Die Grünen et al., 2021), which includes speeding up the energy transformation that had stagnated over the previous years (Ferris, 2022; Schill et al., 2023). In their efforts, they are bound by the 2021 ruling of the federal court deeming the previous effort for climate action insufficient and the following commitment to reach net-zero by 2045 instead of 2050 (Climate Analytics & NewClimate Institute, 2023; Ferris, 2022). In addition, climate protection and the transformation of the energy system are also inscribed in international agreements, most importantly the Paris Agreement and in EU regulations and programmes like the Green Deal and the Clean Energy Deal (Carroll, 2022; Climate Analytics & NewClimate Institute, 2023). According to the Climate Action Tracker, current policies and actions will fall short of the national 65% GHG reduction target until 2030 by only a few percent, but they are overall insufficient regarding Germany's historic responsibility and economic situation (Climate Analytics & NewClimate Institute, 2023). In terms of energy, the goal is to increase the share of RE in electricity consumption to 80% by 2030 and 100% by 2035 (BMWK, n.d.). Furthermore, the phase out of coal was set for 2038, ideally 2030, with the more ambitious 'ideal' goal probably being reached thanks to the EU emissions trading scheme (EET) according to Climate Action Tracker (Climate Analytics & NewClimate Institute, 2023). Another detrimental external factor for the German energy transformation was the Russian

invasion of Ukraine in 2022, which had far-reaching consequences: Attention shifted from long-term transformation goals to ensuring short-term energy security and price stability, and Russian gas was largely replaced by an increase in oil and coal, as well as gas imported from other countries (Hartz et al., 2023). To reduce the costs of electricity, the green power surcharge introduced in 2000 has been abolished 6 months earlier than planned in the coalition contract, with future subsidies for RE being financed through the Climate and Transformation Fund (Bundesregierung, 2022). On the other hand, the war highlighted the dangers of imported fossil fuels and the benefits of RE, which Claudia Kemfert (2022) called “Friedensenergien”, meaning energy of but also for peace. This led to a 75% support rate for the ‘Energiewende’ among the population, with 70% considering it the most important reaction in the face of Putin’s war (IASS, n.d.).

Overall, German citizens were not only mostly supportive of the energy transformation throughout time, particularly when it comes to the phase-out of nuclear power plants (Laes et al., 2014; Öko-Institut e.V., n.d.-b), but actively contributed to it: “[...] a strong environmental movement, the spread of green ideas throughout society, and the rise of the green party helped to push renewable energy sources” at the beginning of the transformation in the 1990ies (Laes et al., 2014, p. 1136). By 2009, more than half of the installed capacity of RE was privately owned by citizens and farmers (BMU, 2011). The ethics commission that had been appointed to reevaluate the use of nuclear energy in the German energy transition after the Fukushima disaster highlighted that the energy transformation represented “[...] a collective process, implying a shared responsibility for government, business, civil society, and individual citizens” (Laes et al., 2014, p. 1137). It was environmental organisations, including Fridays for Future and individual citizens, that sued the German government for a lack of action, leading to a more ambitious climate law (Wefing, 2021). And the current growth in solar energy capacity mainly stems from small, private PV roof systems (Schill et al., 2023).

However, recently the support wavered; first of all because of the heated discussion about the ‘Gebäudeenergiegesetz’, the energy and building act (Huneke et al., 2024; Schill et al., 2023). This is illustrated by the fact that between November 2022 and September 2023 (except for reserving 2% of the surface for RE production from solar PV and wind) in terms of specific measures, only the support for a prohibition of oil and gas heating systems decreased significantly because of miscommunication and the realisation that climate action affects individuals’ lifestyles and causes costs for them (Huneke et al., 2024; Schill et al., 2023). The second issue was the constitutional judgement on the inadmissibility of using the remaining money from the COVID emergency for the Climate and Transformation Fund, which not only dampened the support of the government and climate action, but also poses a challenge for financing the government’s plans, including measures for transforming the energy system (Huneke et al., 2024). Additional challenges described in the literature include simplifying and speeding up approval procedures for RE, the coordinated development of infrastructure, increased flexibility in usage of electricity as well as technological solutions for storing energy, fostering favourable investment conditions, and last but not least, making the transformation socially just and successfully communicating it as socially just (Althoff et al., 2022; Ernst & Young GmbH Wirtschaftsprüfungsgesellschaft, 2023; Huneke et al., 2024; Schill et al., 2023). In the following, it will be explored if women’s networks can contribute to the German energy transformation.

Methodology

Because only limited data on the role of women’s networks in the energy sector is available, a qualitative, explorative research design including the analysis of data from networks’ websites and from interviews was chosen. First, a chronological overview of the research process will be presented. Then the single steps of the individual methods will be described in more detail in the respective sub-chapters.

Chronological overview

After a literature review, networks were selected, and the data from their websites was coded according to pre-defined main categories. Inspired by the results of this analysis, a first set of inductive sub-categories as well as the interview questions were developed. Then potential partners for the interviews were contacted, and additional main categories were deduced from the interview questions. In order to have a better understanding of the networks and thereby be prepared for the interviews, the second coding cycle of the data from the websites was already started before the interviews took place. Afterwards, the coding of the data from the websites and of the transcribed interviews continued in parallel. The results of the analysis are presented in the next chapter.

Selection of women's networks

As the only overviews of German energy networks that could be identified in the literature, the list of networks contained in the PwC study from 2014 and the network names included in the paper by Clancy & Roehr (2003) were used as a starting point for the selection process. The website of each mentioned network was searched for. Where no website could be found via the search engine 'Ecosia', an additional search via 'Google' was carried out and eventually the network was excluded from the further analysis. A first skimming of the websites revealed that for the company networks, very little information was publicly available, and it was often part of the companies' advertisements to attract employees. The described goals usually did not extend beyond presenting the company as a more attractive employer for women and advancing the careers of their female employees (see e.g. ExxonMobile, RWE or E.ON). It was assumed that the analysis of those networks would have been very difficult due to the limited published data and its nature, and the expected impact of those networks on the energy transformation was reduced by their very specific target group and their comparably narrow objectives. Hence, all company networks were excluded.

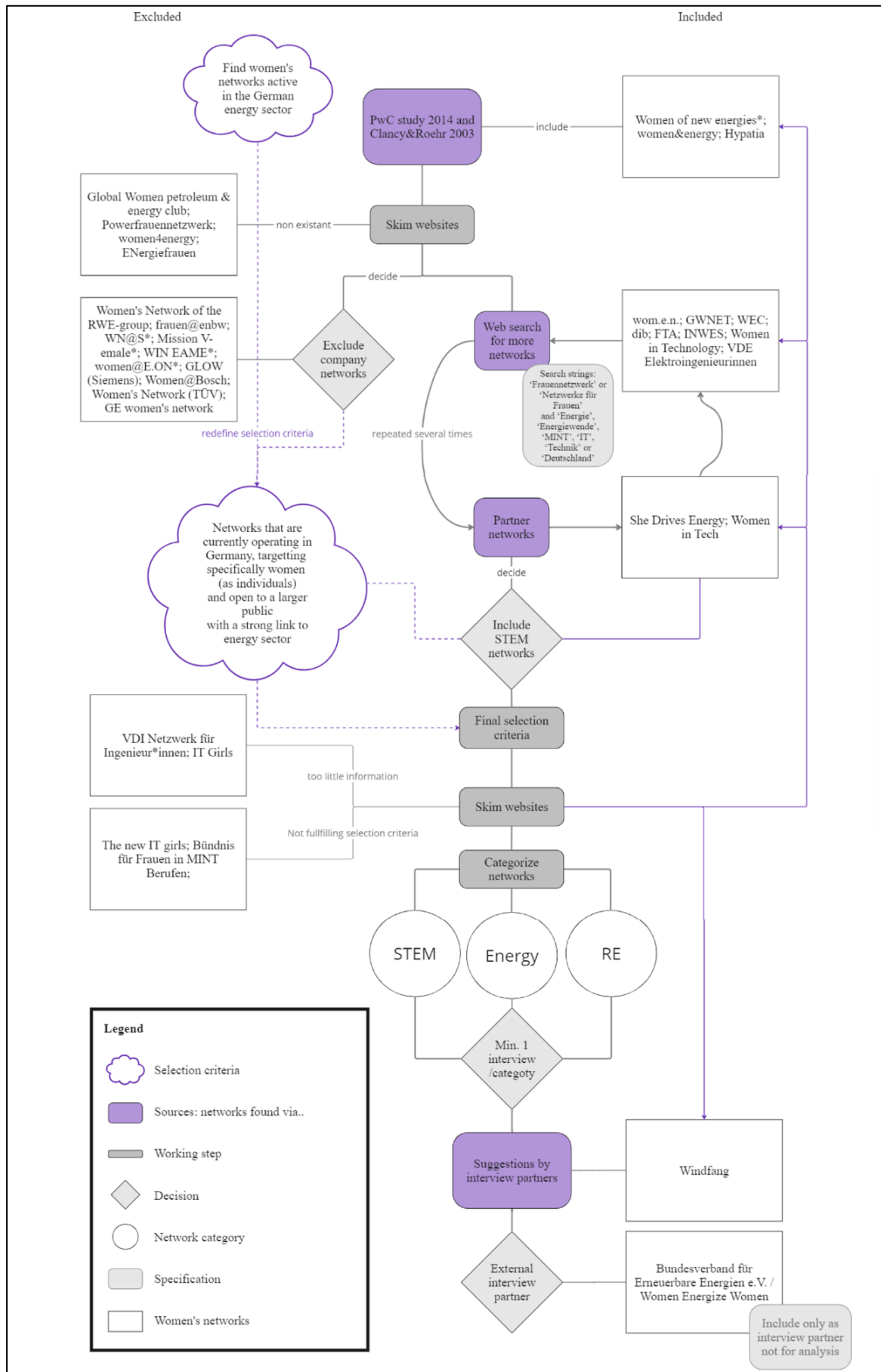


Figure 1: Flow chart illustrating the selection of women's networks for the analysis and for interviews

Some selected networks linked partner networks on their websites, which were subsequently investigated further. This is also how the first networks for women in STEM (fields) were discovered. It was decided to include suitable STEM networks, first of all, because they were named as partners by networks from the energy sector, and secondly, because the STEM sector has the lowest share of women within the energy industry (IRENA, 2019). Additionally, web searches using various combinations of the words ‘Frauennetzwerk’ or ‘Netzwerke für Frauen’, ‘Energie’, ‘Energiewende’, ‘MINT’, ‘IT’, ‘Technik’ and ‘Deutschland’ were carried out. The websites of the identified networks were skimmed, and if they mentioned partner networks, those were also investigated. Both steps of web searches for networks using search strings and web searches for partner networks were repeated several times, until no new names of networks emerged anymore. Eventually, the final selection was made. For this purpose, the original selection criteria (German women’s networks operating within the energy sector) were further specified and supplemented throughout the search process to ultimately read as follows:

Table 1: Selection criteria applied to identify the women's networks to be included in the analysis

Criteria	Definition
Network	It has to enable exchange between individual members in some form and cannot exclusively represent a mentoring programme
Currently operating in Germany	Network has to be active as of December 2023 and have members from Germany
Specifically for women (as individuals)	Network cannot be open to men as active members equal to women and it has to be open to individual women not exclusively women's associations, networks and/or companies
Open to a larger public	Network cannot be exclusive to one specific or a small group of companies or research and educational institutions like universities
Strong link to German energy sector	Network has to be connected to the energy sector through the employment of its members in that sector and/or through their educational background in STEM fields relevant to the energy sector

When selecting partners for the interviews, the aim was to choose diverse networks. The main criterion was that at least one network from the field of STEM, one for women from the energy sector, and one exclusively for women from the RE sector should be included. Additional characteristics that were considered to assess diversity were the size of the network in terms of

members and operating countries and whether or not the energy transition was mentioned on their website. Because of the limited number of networks and the short time frame, the availability of the contacted networks also influenced the final selection. In the end, people from the following networks were interviewed, with some of them being simultaneously part of several networks:

Table 2: Overview over interviewees' memberships in women's networks

N°	Name	Type	Geography	Members	Energy transformation
III	Windfang	RE	Germany	> 200	Yes
II	w.one	RE	Germany	unk	No
I	She Drives Energy	Energy	German speaking area	~150	Yes
IV	GWNET	Energy	Global	>3,500	Yes
II, III	dib	STEM	Germany	400	Yes
V	BEE/Women Energize Women	not a women's network <i>The interviewee expressed her personal opinion and did not speak on behalf of the organisation.</i>			

Data collection

Data collection from websites

The data from the websites was collected between the 4th and 20th of December 2023 and copied directly into the Excel table column representing the best-suited main category. Hereinafter, this copied data was used for further analysis to reduce the workload and assure consistency because, firstly, the data of the websites can change continuously, but it could not continuously be compared to the data that had already been coded, and secondly, many websites contained several pages and/or downloadable documents with partially repetitive text passages, hindering the overview.

The entire websites were scanned for relevant information. Blog sections that contained articles on a broad range of topics beyond the activities of the network itself were excluded. For the news segment, only the first five articles that were no older than five years (in December 2023)

were included, except for articles documenting the founding of the network. In terms of documents provided on the websites, leaflets and strategy papers were treated equally to the text included on the website if they were no older than 5 years. Networks' constitutions were used to retrieve information on the founding year, membership, structure, and goals, but not on methods and tools, because, firstly, some of the documents were more than 10 years old, secondly, they only represented the intended and not the real approach, and thirdly, most such documents remained rather vague. Where available, the English version of the content was used; otherwise, the German text was coded. No translation was made at that point because a summary of the content was intended and a literal translation of all the information would have required a lot of time.

Semi-structured interviews

Based on the recommendations of Danner-Schröder and Müller-Seitz (2017) a guideline for the semi-structured interviews was developed. The developed English original was then translated into German, and the questions were slightly adapted to the different interview partners (for details see Interview guidelines) before three interviews took place between the 5th and the 9th of January 2024. Those interviews were conducted and recorded via the online meeting platform Zoom. The generated m4a files were sent to the LinA-Lab of Leuphana University Lüneburg for transcription. The two interviews that were held in German were translated via DeepL Advanced. Both the transcriptions and the translation were verified again before they were sent to the interview partners for their approval. Following the wishes of the interviewee, some parts of interview II were deleted, certain repetitions and grammatical errors were corrected, and some segments were paraphrased for better comprehensibility. A representative of GWNET who wasn't available for a personal interview due to time constraints answered a selection of the questions directly in written form.

Interview partners from women's networks recommended to reach out to the BEE. Thus, a new guideline was developed, and on the 23rd of January 23, 2024 an additional telephone interview took place with a representative of the organization. Like the other oral interviews, it was transcribed with the software F4x by the LinA lab.

All interview partners agreed for the names of the networks to be included in the transcripts and signed a corresponding declaration of consent.

Content-structuring qualitative content analysis

To analyse the collected data, a content-structuring qualitative content analysis was applied. The process was adapted from the guideline by Kuckarzt & Rädiker (2022): Both the data from the websites and the data from the interviews was coded two times; first following broader, deductive main categories and then along refined, inductive sub-categories. Because the two datasets were available at different moments in time and differed in their content and structure, the coding was carried out separately, but the same categories were used, even though not all of them were relevant for both datasets. All categories are collected in the Coding handbook included in the annex.

Creating the coding handbook

The development of the main coding categories was guided by the literature research and based on the research questions as well as the topics included in the interview guidelines. In addition to the definition, a justification was written down for each developed main category. The objective was to underpin the definition of the categories and thereby facilitate the coding process and make it more transparent. The justifications are included in the coding handbook. In addition to the main categories, some sub-categories were already deduced from the interview questions included in the guidelines. All these deductive categories are included in Table 1. All other sub-categories were developed inductively, as described in the following.

During the first coding of the websites, the definitions of the categories were expanded, e.g., it was specified that the category goal would also include challenges if they could be seen as problems that the network aims to overcome. Furthermore, examples for all categories were gradually added. Afterwards, inductive sub-categories were deduced from the coded passages. To do so, the columns of the table were re-read from top to bottom. If the main category contained only little code that was comparable in nature for all networks, which was the case for name and founding year, the category remained unchanged. For all other categories, inductive sub-categories were introduced to account for the variety of information. Initially, summarising, descriptive sub-categories like platforms or partners were developed for the codes from the first rows. When reading on, more codes emerged. If an existing overarching category fit them well, no new category was introduced. Otherwise, an existing sub-category was extended to match the respective code, or a distinctive, additional sub-category was added. For certain codes, especially within the main category goals, several overarching themes would have been suitable. In such cases, all possibilities were noted on a separate document, and a tally list was created to determine how common each potential sub-category was. The final decision was based on the thereby determined usefulness of the sub-categories and the need to sort each code into at least one sub-category. In the case of goals, for example, a combination of sub-categories based on the scope of the goal (from individual to societal change) and the reoccurring themes of working conditions and female leadership and participation were chosen. In this way, a first set of inductive sub-categories for the data from the websites was created, which was then imported into the software MAXQDA together with all the codes. Afterwards, the pre-coded texts from all the websites were read again several times and more sub-categories and sub-categories to those sub-categories were created to include all the data and enable an in-depth analysis and comparison of the networks. Many of the sub-sub-categories and sub-sub-sub-categories represent in-vivo codes, which were mainly used to quickly show how many networks, e.g., offer mentoring or mention the term energy transformation.

Table 3: List of all deductive categories including the definition of the main categories

Definition	Sub categories	Definition	Sub-sub-cat.
The name of the women's network including the abbreviation and the full name	none		
Information about how the network is organised. In comparison to the category approach the structure focuses on the formal way in which the organisation itself is structured, while approach looks at through which activities the network pursues its goals.	Members*	Information about who is and who can become part of the network.	
Includes information on partners, sponsors... because that is part of how the network is organised	Founding year*	Year in which network was created.	none
Information about how the network tries to achieve its goals and proposed strategies and actions to be taken by other actors.			
Information about what the network tries to achieve. This may sometimes overlap with the approach e.g. connecting women may be considered a goal in itself as well as an approach to reach further goals. In such cases the code can be included in both categories.			
Included on websites as vision, mission, goal or described as "what the networks offers you", benefits of the network. It can also include negative examples and challenges, with the goal being to remove those problems.			
All the effects of networks described by interview partners or stories mentioned on the websites. The difference to goals is that impact describes observed or experienced results, while goals are ideas and visions of what the network would like to achieve.	Individual Energy sector Society Expand impact		
Includes all information on what makes networks of women necessary and what distinguished them from other networks			
Includes all statements regarding women in the energy sector including information on their representation, hurdles, solutions	Share of women Barriers Solutions		Women's networks potential
Includes all statements regarding the energy transformaton			
Includes all statements on the impact of gender, "typical man and women" and socialisation of genders			
Information about how the networks are perceived and how they perceive themselves			
Information on the interviewee including their name, profession, education and membership in networks			
Important information that cannot be sorted into any of the other categories.			

* Had been developed as main categories and later included in the main category structure

** Have been developed inductively as main categories from data included in the category 'other'

The process of developing inductive sub-categories was inversed for coding the interviews because the interviews contained on average much more information that was less well-structured than on the websites, which often already contained chapters like ‘Our goals’ or ‘Our history’. Hence, after first coding along the deductive main categories, very specific, descriptive sub-categories were developed directly from the text. In some cases, in-vivo codes were used at first. Those numerous, specific categories were, in a second instance, summarised into overarching categories. The categories were refined and restructured throughout the entire coding process. In the end, a total of 455 categories was established. They are all included in the Coding handbook.

Results

The results will be presented following the structure of the four subordinate research questions. They refer to the latest status at the time of the data collection.

1.1 Which women’s networks are active in the German energy sector?

Fourteen networks that fulfil the selection criteria could be identified. Six of them connected women in STEM (fields), while the other eight were specifically for the energy sector. More precisely, three of those energy networks indicated they were open to all women working in the energy industry, two were specifically for female leaders within the industry, and three were exclusively for the RE sector. However, Windfang, which was considered to be one of the three RE networks, represented a cooperative rather than a simple network and thus was open to every woman purchasing a share of the cooperative. It has been classified as a RE network because the cooperative stated to produce energy exclusively from renewable sources. Five networks directly or indirectly mentioned the energy transformation. Only one network, the dib, called itself feminist. Overall, the identified women’s networks active in Germany were very diverse. In order to ensure a better readability and, at the same time, do the different networks justice, fact sheets detailing more information on each of them have been created,

Table 4: Overview over all networks including a short description and categorization

Categorization		Name	Description
Energy network	RE network	Windfang	A women-only energy cooperative actively contributing to increase the share of women and RE in the energy sector.
		Hypatia	A network for women in RE and cleantech envisioning a more gender-sensitive and gender-balanced sector and a different understanding of professional success.
		w.one	A German network exclusively for women from the RE sector that aims to improve the participation, leadership, visibility and working conditions of women in the field.
	energy leadership network	women & energy	The German network for female leaders in energy focuses on expanding professional relations among women and make them more visible and influential.
		WEC	An exclusive network for women in executive positions in the energy sector that focuses on business relations between women and an increasing diversity in the energy workforce.
	<i>all women in energy</i>	She drives Energy	The small energy network aims to contribute to the energy transformation by establishing trustful and supportive relationships among women from the energy sector.
		Wom.e.n.	A small network for all women from the energy sector focusing on making the sector more attractive for women.
		GWNET	A global network for women from the energy sector that aims to contribute to the energy transformation through networking, empowering and advocacy of/for women.
	STEM network	FTA	A network of women in STEM aiming to get more women (interested) in technology.
dib		A feminist network of women in STEM, discussing many topics with a focus on structural change to increase the share of women in STEM and improve their situation overall.	
WiT		A network for women in technology in the German speaking region focusing on increasing the diversity in the field to contribute to a more equal and just society.	
INWES		A large, international network of women in STEM with connections to the UN, that aims to advance women's education and influence in STEM for the good of all.	
Women in Technology		A large, global network supported by many multi-national companies with different premium memberships aiming to increase the share of women in technology (leadership).	
VDE Elektroingenieurinnen		A small network of female electrical engineers and information technologists within the VDE, who try to inform about their job and increase the share of women in their field.	

while only exemplary aspects of individual networks and their effect as a unit of diverse networks will be discussed in the continuous text. All Fact sheets can be found in the Annex.

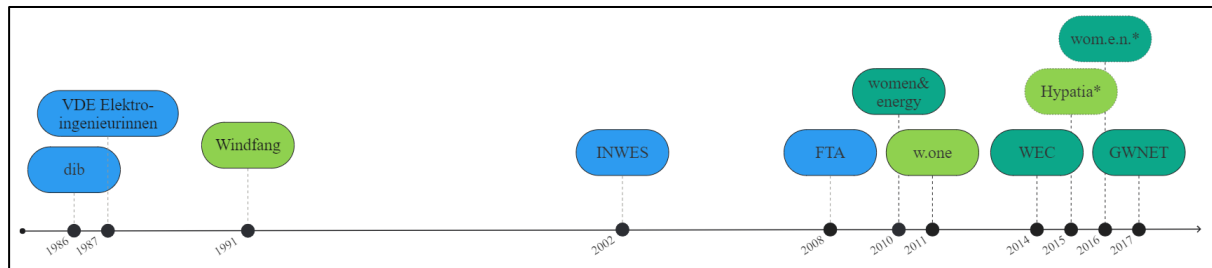


Figure 2: Timeline specifying the founding year of each women's network

*Because the founding year was not specifically indicated, it was deduced from provided information.

The oldest identified network was the dib. It had been founded in 1987, with the VDE Elektroingenieurinnen following only a year later. The only other network being founded before the turn of the millennium was Windfang, which represented an exception, in so far as it was the only energy network that was founded before 2010 and before the STEM networks. It should however be highlighted that for three networks, the founding year remained unknown. For Hypatia, it could only be determined that it had to have been established at the latest in 2015 and wom.e.n. may also have been established in 2017 instead of 2016, given that for the first meeting no date was indicated and the next events took place in early 2017.

Seven of the networks indicated that they focused exclusively on Germany and three of them on the German-speaking area, or Germany and Switzerland. INWES declared that it has members from 60 countries worldwide, while the remaining three networks operated globally. The smallest network had roughly 60 members, while the largest had more than 250,000. The size of the networks was linked to their geographic extent, with the German and German-speaking regional networks having at most about 1,000 members and the international networks having at least 2,300, although the number of their members varied greatly. The largest network by far, however, was INWES, which was only present in 60 countries, compared to other networks operating in more than 150 countries.

The dib explained that “[a]s an association of women for women in the engineering profession who exchange ideas, inform each other and support each other in their day-to-day work, the dib is also a network” (own translation, dib, n.d.-b, see Annex dib pos. 22). Also, the interviewees defined networks through their functions, namely supporting each other and according to interviewee III, pursuing the same or similar goals. Interviewee II added that networks were about reciprocal relationships and that the specificity of women’s networks was the fact that they dealt with women’s topics. Furthermore, interviewee V reflected that groups of friends could also be considered networks in so far as they represented supportive communities, but they lacked the topical connection to energy.

1.2 How do those women’s networks function?

Structure of the networks

Eight of the analysed networks were registered associations, with seven of them including ‘e.V.’ in their official name and GWNET representing an international non-profit organisation under Austrian law. Windfang constituted a registered cooperative (e.G.) and INWES a non-profit corporation. The legal form of the remaining four networks was not indicated on their websites. The dib, FTA, and INWES encouraged regional groups, with the FTA and dib also using working groups to address different topics and w.one having a leadership circle specifically for women in executive positions.

Few networks mentioned it specifically, but from the descriptions on their websites and the explanations of the interviewees, it could be deduced that most of the women’s networks depended on volunteering. This limited the opportunities in which they could get involved both in terms of the geographic extend and of the topics to be addressed by the networks; e.g., the dib explained that it would like to support the demands of other organizations, but “[s]ince the field of these topics is almost inexhaustible, the dib's involvement has so far depended on

whether individual members felt particularly affected and therefore became active. This will not be any different in the future” (own translation, dib, n.d.-b, see Annex dib pos. 49-52).

Networks' offers and tools

Key to assessing the role of networks were also their applied methods and tools: All networks except Windfang mentioned that they organised dedicated in-person or online events for their members to connect, with four of them specifying that those networking events include instructive meetings like lectures, briefings, or discussions. To enable targeted networking, She Drives Energy and GWNET had a directory of members including customisable profiles and like the dib and Women in Technology, they used their internal platforms with a private messaging possibility. The latter two networks also provided job platforms. Interviewee III mentioned that the COVID pandemic had sped up the digitalisation. Besides creating connections, a lot of attention was also paid to transmitting knowledge: Eleven networks offered trainings like specialist seminars, workshops, lectures, and career coaching. Unlike the others, w.one and wom.e.n. explicitly mentioned training for personal development and the dib and FTA also organised excursions. WiT also provided links to “GoVersity university courses and further low-cost education programmes in the form of courses or tutorials on topics such as programming or hardware development” (own translation, WiT, n.d., see Annex WiT pos. 33) on their website. Furthermore, mentoring was brought up in all five interviews. It was officially provided by eight of the networks, in two cases in collaboration with partners. Additionally, a member of the dib also pointed out that even though no official program existed there, some members personally supported other existing programs or individual women that they knew and she herself accepted all girls asking for a two-week school internship if her schedule allowed it. Windfang did not offer mentoring, but a member of the cooperative explained that they provided a sort of safe space where women could try out different positions and tasks to produce RE energy and later apply those skills elsewhere.

Six networks indicated that they would host their own big events, including the International Conference of Women Engineers and Scientists (ICWES) held by INWES every three years, the Husumer Dialog for members and companies by w.one, the FTA conference, and the WiT Roadshow, which visited different cities in 2023. Similarly, nine networks explained to taking part in in sector events, with four of them organising their own events there, e.g., the “Women’s Energy Council Networking High Tea took place in Houston on November 1, alongside the North America Energy Capital Assembly” (WEC, 2020, see Annex WEC pos. 20) and INWES organised the ‘Energize Equity Roundtable’ as an official side event of COP28 in Dubai. For interviewee II, such events offered a possibility to stay in touch with the w.one network, even though her location and the locations of the regular meetings of the network no longer matched.

In terms of outreach, the two re-occurring topics were role modelling (twelve networks) and presenting the job (four networks), which again were interlinked. Three networks explicitly stated that they took part in girls’ technology days (Mädchen-Technik Tagen) or in the case of FTA organised their own experimentation days entitled ‘Girls macht MI(N)T’. In the same spirit, the dib offered mother-daughter classes on technical and craft skills for girls and an adult female reference person. GWNET created “the campaign ‘Energy Transition Role Models: Inspiring the Next Generation of Women Entrepreneurs’, which showcases portraits of remarkable women entrepreneurs in sustainable energy who are working across different disciplines and countries, with the goal to give female leadership visibility and thereby inspire and encourage others – especially young female students and graduates – to follow suit” (GWNET, pos. 54). Hypatia presented selected role models from the energy sector on their website, and WEC did so through their podcast, interviews, and webinars. For its 30th anniversary, the dib showcased 'the 30 most important women in Germany', offering a platform also to non-members from other fields than STEM. Another common tool, referred to by six networks, were awards for women. She Drives Energy and VDE Elektroingenieurinnen handed

out their own study awards, the first for Bachelor's and Master's theses on the topic of energy and the latter for dissertations in electrical engineering and information technology. The FTA felicitas award was targeted at individuals and initiatives and the wom.e.n, Energy Award had been assigned to a company last year. Women in Technology did not remain limited to awards but also offered scholarships and w.one declared to make nominations to the Deutsche Umweltstiftung every year.

Another tool to enhance visibility was the offer by GWNET and wom.e.n, to connect companies and other interested people and institutions to female experts for speeches, lectures, workshops, and so on. The FTA was currently also working on an e-book assembling advice from women, but also from men, on topics like studies, career planning, and work-life balance. In order to “[...] inform about the situation of female engineers and to convey a real and modern image of the profession” (own translation, dib, n.d.-d, see Annex dib pos.53), like the dib puts it, four networks offered information about their respective fields, including through their websites, school visits, and collaborative events with job centres and women's and girls' offices. She Drives Energy also used “Job shadowing, [to get] an insight into someone's job by sharing a full working day with her, individually arranged within the network” (Bisso Bi Mba et al., 2021, see Annex She Drives Energy pos. 44).

To spread news, share information, and promote events, six of the fourteen networks had their own newsletter and the dib even declared to publish a quarterly magazine called ‘Die Ingenieurin’. Interviewee III explained that it was usually produced by one of the local groups, but that depending on the topic, a supra-regional editorial group may be created. For outreach, nine of the networks used at least one social media platform. The most popular one among women's networks was LinkedIn, with w.one stating that “we regularly post about industry topics and w.one activities. You can connect with other members and followers there [...]” (own translation w.one, n.d. see Annex w.one pos. 30). The other mentioned platforms in order

of popularity were X, Facebook, YouTube, Instagram, Xing, and Spotify. She Drives Energy, FTA, and WEC all produced their own podcasts. Women&energy and GWNET also published scientific studies on the nexus of energy and gender and the dib also mentioned its lobbying and committee work as applied methods. Besides, money was also used as a tool by the networks to pursue their goals: Women in Technology declared to donate all the host fees from its events to the Coding Girl Foundation and Windfang indicated they had supported the women's shelter in Bonn, Hamburg, and Emsland after a successful year 2022. Furthermore, INWES explained to advise its member networks on fundraising and sponsorships and its "Educational and Research Institute was formed [...among other things] to expand the reach of INWES through funding of special projects" (INWES, n.d., see Annex INWES pos. 22)

Since collaboration with partners is closely linked to the impact of networks and how they are perceived by stakeholders, this topic is analysed in the fourth sub-chapter. A list of the partners of the individual networks is also included on their respective fact sheets.

1.3 What are they working for?

Each network described its own specific goals, which are again presented in more detail in the fact sheets. When it comes to the goals for the networks themselves, all of them aimed to build connections between women and seven of them underlined the diversity of their members. Diversity looked different depending on the target group of the network, e.g., GWNET aimed for interdisciplinary networking, Women in Technology stated that "our people are as diverse as our communities" (Women in Technology, n.d., see Annex Women in Technology pos. 4), Hypatia declared that they were open to women "of all ages and professional backgrounds, from students to managers and company directors" (own translation, Hypatia, n.d., see Annex Hypatia pos. 53), and FTA "[...] combine[s] expertise in the STEM sector, from Industry 4.0 to particle physics and electromobility" (own translation, FTA, n.d., see Annex FTA pos. 11). Women in Technology elaborated that they saw diversity as a strength and helped their

members in creating inclusive environments both within and outside of the network. For most networks, networking was also about sharing experiences and knowledge and in this sense wom.e.n, and Women & Energy argued that the diversity of their members could help spark creativity and develop new and innovative solutions. A reoccurring goal was also to build trust between the members and enable a relaxed and easy exchange. Women in Technology also pointed out that they aimed to have fun while “[striving to be] the leading global organization for women in technology and allies” (Women in Technology, n.d., see Annex Women in Technology pos. 34).

The first target group of women’s networks were individual women and thus many goals and promises regarding those key actors could be identified: The establishment of connections between them could already be seen as a goal in itself, with the Women’s Energy Council promising that members could “meet the most senior female executives both in your region and globally at our exclusive Private Dinners, VIP Receptions, Discussions, Briefings and Roundtables” (WEC, pos. 12). Many described network events as being only for members, but in certain cases, those events were also open to non-members. Hypatia, for example, underlined that members could take part in network meetings for free and pay nothing or a reduced fee for external network events. Additionally, many other goals and benefits built upon the concept of networking: Networking was envisioned to help members increase their visibility within their sector and allow them to make their voices heard more easily. Nine of the networks highlighted their role in supporting members in their professional and personal development through mutual support and activities offered by the networks. For this, networks also promised exclusive and timely access to important information. For interviewee II, “[...] networking is something where I put something in, where I can hear something out” (Interview II, pos. 111). INWES also promised that through their individual memberships, women could support women in STEM networks worldwide. A common goal was also for women who had already succeeded

in the sector to pass on their knowledge and experience, e.g., through mentoring. Mentoring was envisioned to get more women into the energy sector and to support them in their careers within it by the interviewees, which resonated with the explanations of GWNET and w.one why they used mentoring, namely to push the careers of mentees and to provide female role models to avoid alienating women from STEM fields. It was highlighted that also mentors benefitted from the programme by getting insights into new fields and different challenges through their mentees and into their own career choices through reflection and by improving their reputation and being able to help others.

Although only She Drives Energy explicitly named them as addressees of their activities, four of the STEM networks also stated that they aimed to enhance girls' education, particularly in STEM or technology. Nine of the fourteen networks explicitly mentioned that they tried to attract more girls and women to the energy sector or other STEM fields. To achieve a higher share of women, networks tried to promote companies that value gender equality and connect them with potential employees. Interviewee II explained, "You have sponsors. That works through the companies. On the one hand, it's about being known as a network among companies and, on the other hand, making also the companies through our networks and as sponsors at events known, as companies in which it is clear that they know the women's network" (Interview II, pos. 142). Another key element for the achievement of a better gender balance, in turn representing a goal on its own, was the inspiration of young people through increasing the visibility of women in technological fields and the energy sector. This was mentioned by all but three networks. Women & Energy explained that because so few women had managed to reach leadership positions in the energy sector, it was crucial that those who did were present in public. This links to the next goal of women's networks, namely pushing the careers of women and helping them reach senior roles. They wanted to support them and offer them a stage "[t]o balance the picture of the still predominant image of male leadership" as GWNET

(GWNET, n.d., see Annex GWNET pos. 90) puts it. More broadly, women's networks aimed to empower women and enable them to fully participate in energy and technology, including in decision-taking. However, presenting the sector and the women that work in it was only one side of the coin; women's networks also wished to change the energy sector beyond increasing the share of women. In terms of working conditions, the most common goal was improving the work-life balance for employees, with three of the six networks that mentioned it talking more specifically about balancing career and family life. Wom.e.n. strived for “[o]pen, interdisciplinary, cooperative and sustainable approaches” and w.one aimed for “an attractive working environment and good entry and career opportunities in renewables” (own translation, w.one, n.d., see Annex w.one pos. 53). Three of the networks also affirm that they advocate for equal pay.

Furthermore, four of them declared that they wished to contribute to the energy transformation. These were one of the RE networks and three energy networks. Additionally, FTA and dib mentioned RE or the energy transformation and INWES had organised an event at COP28. Windfang mainly aimed to contribute through producing RE and pushing RE technologies, while the other three networks wished to provide input in the form of knowledge and innovative ideas through connecting women, as well as information on the role of women.

Energy networks further mentioned equal opportunities for men and women within the energy sector as a goal and GWNET also specifically mentioned raising awareness about gender and energy. For all sectors, different women's networks also wished for all people to be able to pursue their career regardless of their gender and without having to compromise their wishes for their personal lives and for professional success to be evaluated differently in the future. Nine of the networks also addressed stereotypes and gender roles: Hypatia declared that “[i]t should be a given that women also achieve in practice everything that is theoretically possible” (own translation, Hypatia, n.d., see Annex Hypatia pos.39). The focus of networks efforts lay

mainly on the perception of technology as a male domain, which discouraged women from pursuing a career in these fields, but they also called for challenging established practices and ideas more broadly, e.g., they wished for more men to choose social professions and take greater responsibility for care and domestic work. The declared goal was to advance equal opportunities and rights for all women. And while Women in Technology proclaimed that “[they] believe that we can achieve gender equality with the help of technology” (Women in Technology, n.d., see Annex Women in Technology pos. 32), the dib rather promoted a feminist critique of technology and opposed the “exaltation of technology” (own translation, dib, n.d.-c, see Annex dib pos. 84). Two of the networks directly or indirectly claimed that men would also benefit from overhauling constricting gender roles and INWES explained its vision of “[b]ecoming an influential voice on STEM issues for the benefit of women, gender equity, and society” (INWES, pos. 41). Furthermore, networks did not only focus on gender, six of them also mentioned ‘diversity’ within the workforce and society and interviewee V from the BEE also raised the issue of intersectionality. To reach their goal of more and better careers for women, Hypatia strived for “[s]ensitising stakeholders in business, politics and society” (own translation, Hypatia, n.d., see Annex Hypatia pos. 40) and three of the networks also stated that they tried to influence decision-making and policies.

1.4 Do they have an impact on the German energy transformation? And if yes, which impact do they have and how do they achieve it?

As three interviewees pointed out, it is difficult to pinpoint or measure the impact of women’s networks on the energy sector or society, but the results can illustrate their effects to a certain extent.

The only numerical results are the number of people that the networks reached: Women in Technology claimed that their network has reached 3.5 million people, although it remained unclear how they did so or how they calculated that number. GWNET stated that they had

offered support for more than 540 mentees from more than 90 countries thanks to their over 500 mentors, six study tours, and five publications. W.one counted about 90 mentees since 2014 with interviewee II elaborating that “[it’s] always a single woman, so to speak, and that’s why there isn’t the broad mass, the broad impact as such” (pos. 61).

Impacts on individuals

Only interviewee III at first questioned that the network had had an impact on her individually. She then specified that it did not impact her career choice or trajectory, but that she met women from all over Germany and from different engineering specialities and learnt new things, particularly soft skills, thanks to the dib. She described the networks as safe spaces where she and other members could try things out, including chairing assemblies of the association and, in the case of Windfang, producing RE. This linked to the mission of Windfang: “An original objective is to increase the work experience of women in energy projects. A number of the original members have now moved on to establish their own renewable energy businesses” (Clancy & Feenstra, 2019, p. 30, see Annex Windfang pos. 29). Interviewee III also explained that simply discussing topics like energy transformation or sustainability within the network would make women stronger in their arguments with people outside of the network. So, women learnt things within the networks and could then apply them elsewhere. This aspect of capacity building was also mentioned by interviewees II and V, who referred to trainings offered within the networks and the latter to mentoring. During two trainings, one organised by w.one and the other by a regional group of the dib, interviewee II was introduced to the insignia of power and the concept of rope teams. The former helped her understand that different people perceived status symbols like the corner office or a big car differently and that “[i]t’s important that I show myself as a woman. It’s important that I’m present. And what am I present with?” (Interview III, pos. 100). She summarised the rope team as pulling each other up and being aware of the fact that the person on top of the mountain could only stand there thanks to their team member

and she observed that men usually played this better than women. She elaborated that, while men referred to each other more often in meetings and pushed each other's ideas, one of her female colleagues found it disconcerting when she gave her visibility and constated that women often found it difficult to deal with people complementing their achievements. At the same time, from a recent discussion at the German Association of Women Academics, she concluded that for women, it was particularly important to get positive feedback from others because they may struggle to recognize the worth of their work. Here women's networks come in again; both interviewee V and interviewee II saw them as places where women can get external validation. Interviewee II elaborated that to her, the dib and w.one were so valuable in this regard because, firstly, the women within the networks dealt with the same or at least similar professional topics and their feedback thus meant more, and secondly, the members had dealt with the concept of complimenting each other and how to accept praise. More broadly, the networks also offered spaces to simply 'exchange'. Interviewee II described this as the most important impact of She Drives Energy because of the constant feedback she got from members of the network. Following interviewee IV, offering this safe space for exchange "where women can talk about the challenges of working in a male-dominated sector, and how to navigate e.g. work/life balance issues" (Interview IV, pos. 9) was particularly important within the energy sector "[b]ecause there are so few women in these jobs, most women will not be able to discuss this with direct colleagues" (Interview IV, pos. 9). Also, topical questions could be answered within women's networks, especially if they were specialist networks like w.one. Interviewee II illustrated this with the examples of asking for experiences regarding the termination of employment and regarding a specific service provider for wind energy. Interviewee III explained that within the dib "we've already brokered some contracts" (Interview III, pos. 63). Women's networks were not only useful for their jobs, they also helped members find new positions: "So we can also support each other very well here. After all, some of us are in a position where sometimes they have jobs to offer or can say where extremely interesting jobs

would be and can then also announce this [...]" explained interviewee III (pos. 63) and interviewee II admitted that, if it had not come up within the network, she would not have considered applying at the municipal utilities in Wiesbaden, where she worked for several years. For many members, networks, or at least the dib in particular, were also helpful when moving because they existed in different locations. The general support they received within women's networks, according to interviewees III and IV, signified that fewer women left the energy sector or engineering. This links to statements by them and interviewee II about networks making women feel good: They could reduce frustration, made them feel less alone, and energised them through connecting women. The diversity of women, including their age range, was described as exciting by interviewees II and III. They underlined that they met many "very wonderful very exciting women" (Interview II, pos. 8), from whom they could learn something and benefitted professionally. Interviewee I also asserted that her work with the network helped her build a professional network in the energy sector. In this sense, interviewee IV analysed that through their work, "networks support women in the sector, so that more of them advance in their careers" (Interview IV pos. 11). And the members of the network, in turn, reached back to help others: As already mentioned, interviewee III explained that she would accept all girls that ask her to do their school internship with her if she has the capacities and interviewee II mentioned that she thought about how to apply the rope team concept both within the company and when she would hear about job openings, to 'pull women along'. Interviewee V also described a sort of virtuous cycle between women joining the energy networks and the energy workforce.

Impact on the energy sector

Share of women in the sector

All interviewees perceived an underrepresentation of women in the energy sector, with interviewee II saying the share of women is “scary” (Interview II, pos. 12) and interviewee V calling it “crap” (Interview V, pos. 18). When asked about why it would be important to increase it, the latter stated that “the fact that we asked this question is an issue, [...] or that we have to ask this question” (Interview V, pos. 34). She was convinced that the participation of women was required, firstly, to create a holistic system that would consider the needs of all people who were affected by it and secondly, to make the system more efficient by better understanding what energy is used for and when it would be needed. Increasing the share of women would also be necessary to enable a closer exchange among women also at their workplace and to reduce sexism in the sector, according to the two interviewees. Interview III revealed that the share of women, at least in engineering, had already significantly increased in the last 50 years, but she herself and interviewee V underlined that the change was happening too slowly. According to interviewee I, the sector had historically been dominated by men and the androcentricity created barriers for women to enter and remain in the sector. Listing every single barrier and solution mentioned by all interviewees would exceed the scope of this analysis. However, they are marked as such in the transcripts of the interviews, which include all a visualisation of the assigned categories, and they will be briefly discussed in the next chapter. It is, however, still important to acknowledge that all interviewees discussing the topic mentioned that the share of women varied including according to individual companies, fields of work, rank, and between RE and fossil fuels.

Regarding a better gender balance, interviewees mentioned four main potentials of women’s networks, which according to interviewee I also would depend on the type of network: firstly, creating awareness by providing visibility and recognition for women and showcase role

models for girls and young women; secondly, fostering learning for members through mentoring and knowledge transfer; thirdly, connecting women and enabling mutual support among members; which lastly, should all contribute to advance women's careers. And interviewees also affirmed that networks have had and continue to have an impact on gender balance: "I think in order to step up the [...] gender parity in the energy sector, we need, first of all, to encourage people to enter the energy sector. This is always easier when there are role models there", said interviewee V (pos.22) and added that networks did in fact provide such role models. Also, interviewee III believed that thanks to the dib, there were more female engineers because more women chose the field and remained within it. Furthermore, Windfang continuously asked for women to work at their RE production sites, with interviewee III explaining that usually the construction companies, especially the plant operators, also accommodated that wish. According to interviewee II, network events were useful for connecting members and the analysis of the websites revealed that at least four networks also used them to bring together members with companies dedicated to gender justice. However, network events were also useful to bring attention to the networks and women; as interviewee II pointed out, "it's amazing how many people react to it, both women and men who aren't there themselves. They then say: 'Hubs, there are so many women. [...]' So just this: 'Yes, that's exactly how it is. We're there too' or 'As women, we're also a big deal, a lot of people'" (Interview II, pos. 119).

From her outside perspective, interviewee V evaluated that women's networks were largely responsible for raising the issue of gender and energy. She observed that at the COP28, the topic was very present and she herself attended six events on the topic, with at least three of them being organised by or in collaboration with women's networks. Interviewee I was also pleased that "[s]ome of the larger companies in the sector are our sponsors and actively support our work. And I personally see like (sic.) this growing acknowledgement of the importance of

the issue of gender equality in the industry” (Interview I, pos. 25). Furthermore, interviewee IV pointed out that networks could hold companies and governments accountable to pay attention to the gender dimension and they made it possible to recognise discrimination by revealing patterns within the experiences of women that they make within the energy sector because they are women. She also highlighted that paying attention to gender and making a sector more accommodating for women would also make it more attractive for men because “most young fathers would prefer a better work-life balance, too” (Interview I, pos. 11). Also, eight of the networks and two interviewees stressed that being more gender-balanced and gender-fair would benefit the energy and STEM sectors in several ways: According to WiT and Women in Technology, female employees could contribute to a good working atmosphere and “create a culture of inclusion, diversity and belonging in the workplace [...]” (Women in Technology, pos. 32). Six networks saw a chance for women in their networks to developing new, creative ideas and offering constructive and innovative input for their sectors and companies, including through interdisciplinary networking. Interviewee II mentioned that including women may bring new perspectives into discussions and, in the end, potentially enhance the security of projects. On a very practical level, three networks highlighted that a more diverse workforce would improve the economic performance, and one pointed out that training and recruiting women could reduce the lack of skilled workers.

Impact on the energy transition

When asked about the impact of women’s networks on the energy sector, interviewee II immediately thought about the energy transformation and responded that “[...] the energy sector, the renewable energies attract a lot of people who say: 'I want to do something meaningful, and meaningful for me means energy production that is renewable'. [...] So I've noticed that rather the topic has a massive impact and, thereby actually, the people who help to support and shape it, and there were also an incredible number of men involved. So that’s why,

I don't think, [...] that a women's network would have made any kind of impact” (Interview II, pos. 39-41). The interviewed women gave different definitions of the transformation presented in Table 5.

When asked specifically about the contribution of women’s networks to the energy transformation, interviewee II elaborated that they could indirectly influence it through their members when they would pose topical questions in the network. Similarly, interviewee I argued that “We aim to contribute to that transformation to a sustainable energy supply by, I think the most important aspect is to provide an interdisciplinary space for inspiration, exchange of idea, knowledge transfer, in like those very specific technical fields” (Interview I, pos. 51). Also, interviewee III discussed ideas that arose in the network and highlighted that it could also be more personal recommendations, like installing solar panels on balconies, which another member proposed to them years ago. Windfang also actively produced RE, and some of its members have started their own businesses in the sector after collecting experience within the cooperative. The interviewed member, however, underlined that they could not have much of an impact anymore because they were too small for it, but that they did inspire people in the vicinity of their power plants: “And now there are wind farms all around and the church has rented out a lot of land and is making a lot of money from it. And the farmers. And then there are also community wind farms and all that” (Interview III, pos. 81). In her opinion, this would not have happened, or at least not as quickly, without them initiating the first windmill in the village. She also mentioned that Windfang would collaborate with community energy projects, because they share the goal of producing energy close to and with the local communities that should also derive benefits from it. Similarly, interviewee IV highlighted that women’s networks more generally “[...] help to ensure that the energy transition is just, leaves no one behind, that the benefits and costs it generates are shared equitably between women and men, and that the future energy system is designed by and for everyone, including women” (Interview

Table 5: Personal definitions of the term energy transformation provided by the interviewees I, II, III and V

N°	Definition
I	<p>P2: I think for me... This is like the answer for me, not for the network. I'd say to me energy transformation means like fundamental and very importantly, systemic changes in the way we, I would say produce, distribute, but also consume energy. And I think key aspects to this transition is, for example, to transition to a sustainable energy supply, to reduce greenhouse gas emissions and also mitigate the impact of climate change. I'd say the adoption of energy efficient technologies, but also very importantly, behavioural changes and the creation of accessible and secure and resilient energy systems. That's it. #00:18:47-7#</p> <p>P1: Okay. Just one follow up on that. You said sustainable energy systems. [...]. What exactly do you entail with that? #00:19:02-8#</p> <p>P2: By sustainable energy systems I mean energy systems that minimize negative impact on the environment, reduce GHG emissions and ensure a secure and just energy supply. This means the transition to renewable energy carriers, the adoption of sustainable and efficient technologies, circularity, but also ensuring resilience and accessibility. Further, I believe that technological change alone will not be the solution as efficiency gains can increase consumption and lead to rebound effects. Thus, norm and value changes in the way we consume are needed as well.</p>
II	<p>For me, the energy transition is when we have managed to generate not only electricity, but also heat and then mobility, when we actually want to generate all of this on a renewable basis. And then we will have made consumption renewable, so to speak. And there's still a lot of technology and work and implementation involved. #00:40:17-1#</p>
III	<p>How should I express that? What it means for everyone? (Laughing) That would be. Something very personal, I don't have that. I mean that we have to somehow, yes, manage to make do with the raw materials we have here on earth and therefore actually would have to work regeneratively. And that we have to somehow limit climate change, otherwise I can't think of much else. [...]</p> <p>And yes. You do give it a lot of thought. I mean, I'm from the water sector and I think more about the whole flood situation now or about drought or conflicts over water. But they also have something to do with climate change and the energy transition.</p>
V	<p>But I think what energy transformation means first of all the switch to sustainable energy in general, so kind of to, to renewable energy. (...)</p> <p>But it also means like kind of a rethinking of energy, you know? Like kind of a rethinking of how, how is this system organised. So, for instance, we could, if we switched now to 100% renewable energy, but we left the grid [...] infrastructure as it is, then there would still be people without access to renewable, erm to energy, you know. So basically it is, I think energy transformation means on the one hand side the switch to renewable energy, 100% renewable energy, and on the other hand side it means to include every single person and especially the needs of every single person in the process of creating a system. So, there might be people who are living very remote and there might be no grid, okay, then what do we need to supply? We need to supply solutions that are not on the grid. So basically thinking about all the people that are living on the planet and the needs of every single, every single group. Basically, we can't we can't consider the need of every every single individual, because that would be that is that is, that would be amazing. But I think, yeah, a proper energy transformation, in my opinion, would be people at the centre, and the planet at the centre of, of of the system that we build. So basically what do we need? What, what does everybody need? And then just start from that. Kind of, it's kind of a very also not that not a very clear answer, I am very sorry about that. But I think an energy system needs to serve the people, that the energy is for.</p>

IV, pos. 11). Interviewee III also explained that within their network they discussed sustainability and they also tried to transmit this goal to others outside of their network.

Impact on society

In fact, one energy network and four of the STEM networks described their members as agents of change: FTA simply stated that women transform societies; GWNET highlighted that gender equality is “an indispensable factor in reaching sustainability” (GWNET, pos. 93); for Women in Technology, it was about creating inclusive and impactful tech industries and technologies; WiT highlighted that trained women could collect data on women’s issues like old-age poverty or women’s health and actively create solutions; and “[t]he mission of INWES is ‘To build a better future worldwide through the full and effective participation of women and girls in all aspects of Science, Technology, Engineering, and Mathematics’” (INWES, pos. 60). The networks also made women visible. Both, interviewees II and III saw that as the biggest impact of their networks, with interviewee III explaining that PR is key to being impactful beyond the network but difficult for the dib also because engineers have not learnt to present themselves well. Interviewee II recounted that w.one was present at big industry events and showed everyone that there were also many women active in the energy sector. The topic of being present or being visible (German: präsent) was a reoccurring theme of interview II, with the interviewee explaining at one point that making women, also as individuals, visible would represent advancement of women (German: Frauenförderung) and elaborating that when the networks created visibility, they also would offer it to women outside of the network, like when presenting the 30 most important women of Germany. Women’s networks like the dib not only pushed women but also topics that were not necessarily related to the energy sector or STEM. In fact, the dib, as part of different women’s councils, had already voted on many issues, e.g., high insurance fees for home births: Interviewee II remembers, “And there [...] we got involved. And I think the issue was really heard then, which is why I think it's good when

women's networks get involved” (Interview II, pos. 41). Interviewee IV also argued that energy networks also normalised the idea of female technicians, engineers, or CEOs and she and interviewee V both underlined that such networks played an important part in providing role models, inspiring women to join the energy sector and other traditionally male-dominated fields.

Limits to and expanding women's networks' impact

As mentioned, several interviewees pointed out that the impact of their networks on different aspects was difficult to assess: But while all three interviewed networks, which answered the question regarding the energy sector, often hesitantly described their impact as rather small; the interviewee from the BEE immediately answered the question if they had an impact, with “Yes, I would say absolutely, with absolute certainty” (Interview V, pos. 8). To expand their impact on the personal level, interviewee V thought they needed to be known by young women already when they would decide what to study and, generally speaking, be present. Universities and other educational institutions were indeed mentioned by several networks as important partners, especially for recruiting new members. Regarding the structural level, measuring and expanding the impact was more complicated, in her opinion, and she discussed networks' role in creating pertinent studies and whether those were read and taken up by policymakers. For interviewee II, the future of networks depended more on which activities they should maintain and add to their offer. And interviewee I believed that women's networks impact could be expanded through strengthening collaboration: “[...] cooperation with larger actors in the energy sector be it private or public or other women's networks or even individuals that would like to participate and can help women's networks extend their reach in the sector and then achieve their common goals, kind of bundle the capacity, basically” (Interview I, pos. 31). In this regard, interviewee II mentioned that companies were in fact increasingly interested in collaborations with networks because of the shortage of skilled workers in the wind industry.

Collaborations

Most collaborations with companies, which all but two networks mentioned, took the form of sponsorships or supporting memberships. The main impacts were connecting employees and employers and more generally promoting each other, e.g., through actions like #memberstuesday, on which w.one would present its corporate members on LinkedIn. W.one also mentioned that they support companies in enhancing equal opportunities for women in their institutions and WiT and FTA host shared events together with companies. Collaborating with universities and other educational institutions enabled networks to recruit new members and inspire more women to join the energy or STEM workforce. Another commonly mentioned partner were other women's networks and organisations. The different organisations would promote each other, e.g., by sharing each other's posts on social media, like interviewee I explained. The BEE, through the campaign 'Women Energize Women' also offered visibility to topics, studies, and events of women's networks regarding gender equality in the energy sector. The dib collaborated with others on the campaign 'Frauen in der Wirtschaft' to showcase how many women were on DAX company boards, and Women in Technology mentioned "[...] working with the press and media on powerful content" (Women in Technology, n.d., see Annex Women in Technology pos.48). The aim of collaborating is to make issues heard, e.g., Windfang also collaborated with other citizen energy projects because they have similar goals: "that it shouldn't be so detached but should also be wanted by the people who are on site and at the same time be associated with benefits for them", interviewee III (pos. 75) explained. However, women's networks would not only focus on advancing their own goals but also supported others in their demands, as illustrated by the example of the midwives. Besides going topically beyond the energy and STEM sectors, collaboration also made international exchange, learning, and impact possible, even for smaller networks. Additionally, by joining forces, it may also be more likely to be invited to big events, like a representative of dib being sent to a round table on the energy transformation in Lower Saxony on behalf of the state's Women's

Council. However, interviewee III explained that because she, unlike most others from bigger associations, was not paid, “someone like me sits there and just thinks, 'I can't even read all the documents they send out beforehand because it's far too much work'. So that wasn't so successful” (Interview III, pos. 71).

Self-perception and perception by others

In fact, at several points, interviewees I, II, and III explained that all their networks had limited resources, which they linked to the small size of the network and the work being carried out by volunteers, meaning that a lot would depend on the capacities, resources, and interests of individual members.

According to the description provided by interviewees, other actors all perceived the networks positively. Interviewee I explained that She Drives Energy received positive feedback from partnering companies but also from strangers on social media and interviewee III remembered that the mayor supported Windfang and they even had celebrated their jubilee in his barn. Both underlined that the different stakeholders they interacted with appreciated their work. Additionally, both interviewees I and II observed that the topic of gender was increasingly becoming important in the energy sector and companies were more interested and willing to collaborate, also because of the lack of skilled workers in the (wind) industry. Interviewee I also observed that “[...] you see more and more women's networks and equality initiatives coming up in the sector. And I think that illustrates that there's like (sic.) a demand for change. And a lot of people, like members of those initiatives and networks, kind of shows that people are there and they're willing to actively contribute to making changes in the sector” (Interview I, pos. 27).

Discussion

In this chapter, the most important and interesting results presented in the previous chapter will be analysed and discussed.

1.1 Which women's networks are active in the German energy sector?

The definitions provided by the interviewees of women's networks focusing on their purpose of exchange and support, do not completely differ from the definition of professional networking in general, defined as "a series of goal-directed interpersonal interactions with one or more network contacts that build and maintain professional relationships and that comprise the mutually beneficial exchange of resources that are instrumental for work and career success" by Porter et al. (2023, p. 3) in their analysis of people's reasons for joining professional networks. It could be argued that the fact that several networks specifically for women exist, which in their general concept do not significantly differ from mixed networks, underlines the necessity for targeted support for women. This aligns with the observation that only for male but not for female business school alumni, taking part in activities offered by traditional, mixed networks translated into more promotions and better compensation levels (Forret & Dougherty, 2004). Another factor may be the topics discussed within groups. Interviewee II explained that in male-dominated groups she struggles to connect with others, because topics like sport do not interest her and she identified the focus on women's topics as the aspect that distinguishes women's networks. This links to the observations by Emmons Allison et al. (2019) that it may be difficult and uncomfortable for women to join traditional, male-dominated networks because of the discussed topics including sports and gendered trash talk.

The number of networks active in the German energy sector, fourteen, may seem surprisingly high at first, but those networks are very diverse. Six of the analysed networks were STEM networks. Many more such networks were excluded because they had no strong link to the German energy sector. It seems coherent that many such networks exist, given that the STEM field is so broad and the literature has identified technological fields and STEM within the energy sector but also beyond as a field with one of the lowest shares of women in the workforce (IRENA, 2019). The fact that they were the first to be founded, as well, may be explained by

the breadth of the field and the consequently larger recruitment pool. RE networks, on the contrary, are comparably young, which is probably linked to the fact that the share of RE had reached 15% only in 2015 (UBA, 2024). No leaders' network specifically for RE exists. This may again be linked to the young age of the sector and its comparably low number of employees and disproportionately lower share of female leaders (IRENA, 2019); however, this may also be an intentional choice by the networks, with many of them striving for established workers to pass on their knowledge and experience to the next generation. If the network was open only to women who are already in senior positions or on their way there, this may exclude large parts of the female workforce. The categories of energy networks and RE networks, which both count three networks, each contain two similar networks. Interviewee II explained that the activities of w.one are mainly focused on Munich and Hamburg. Maybe the similar networks have, or at least in the past, had different local foci, even though their geographic extent is generally described as Germany or the German-speaking area.

1.2 How do those women's networks function?

Although most networks include information on the organs of the associations, their responsibilities, and who currently holds which position on their websites, and that information has usually also been coded, it was mostly disregarded for the analysis because it did not seem relevant for assessing the role of women's networks in the German energy transition.

Most energy networks are registered organisations and non-profits, which aligns with their charitable cause of connecting and advancing women. The literature did not specify how they expect women's networks to operate, but with the main goal of any network being to connect people, it was to be expected that networks organise dedicated events for their members. Clancy & Feenstra (2019) mentioned networking and mentoring together as a strategy for creating a supportive community and providing learning opportunities. Indeed, eight of the networks officially, as well as members of the dib personally, offer mentoring and networks also provide

other training opportunities that link to this idea of them educating women. Another aspect mentioned in the literature (Clancy & Feenstra, 2019; IRENA, 2019) and confirmed by the analysis are networks organising awards for women. There are also tools and approaches envisioned in the literature that authors did at least not explicitly link to women's networks: These are, on the one hand, the targeted scholarships mentioned by IRENA (2019) and offered by Women in Technology; and on the other hand, the importance of role models discussed by Pearl-Martinez & Stephens (2016). In fact, networks provide role models for the energy sector, the STEM field, and women in general through campaigns like the dib's 'The 30 most important women in Germany', but also by providing information on their day-to-day work and career paths of members, as well as taking part in and offering their own 'technical days' for girls. Linked to this idea of role modelling is also the topic of the outreach of networks: This topic is not explicitly mentioned in the literature, but the various tools, including social media, podcasts, a magazine, and scientific studies applied by networks, show that besides the internal connecting, supporting, and learning, also the exchange with stakeholders outside of the networks is important for the networks.

A last interesting aspect is the financial dimension mentioned by several networks in different contexts. Money is used as a tool in the form of donations by two networks, with one of them, namely Windfang, also paying out profits to members (The Women and Gender Constituency, 2017), and another network advises member networks on fundraising and finances. When recounting her experience at a roundtable on the energy transformation in Lower Saxony, interviewee III also highlighted that, unlike many others, she was not paid by her network or the women's council to take part in the event, limiting her full participation in so far as she could not prepare intensively. The same is true, according to her experience, for international collaborations. Money can thus be seen as a tool utilised by, but also as a limiting factor, for networks. Given that the literature identified the gender wealth gap as a limiting factor of

women's full participation in citizen energy projects (Fraune, 2015), it seems particularly important to pay close attention to the fact that money does not as well become an important barrier for individual women to join networks and for networks to be impactful. Many women's networks have low fees or are completely free of charge, which makes it easier for individuals to join them. However, many women also simply lack the time to volunteer because of their higher share of care and domestic tasks (Clancy & Feenstra, 2019). Using the example of Windfang, Clancy & Feenstra (2019) and Karakislak et al. (2023) argue that this could be partially counteracted by paying women for their work on energy projects. This idea could also be applied to women's networks, but it would represent increased costs for networks and the financial resources of networks cannot be assessed based on the collected data.

1.3 What are they working for?

The specific goals and how much emphasis is put on each vary for the different networks, but the general aim is to connect women, support them in their careers, and attract more women to the energy sector or STEM fields. The different goals connect to the barriers to entering and succeeding in the energy workforce for women identified in the literature: One of the described key hurdles are stereotypes and gender roles (Chaumont et al., 2021; Emmons Allison et al., 2019; IRENA, 2019; UNESCO, 2017), which some networks explicitly stated to try to challenge and many of them counteract indirectly in various ways. To begin with, they aim to offer visibility to women, especially in technical fields and leadership positions, “[t]o balance the picture of the still predominant image of male leadership” (GWNET, n.d., see Annex GWNET pos. 90). This also directly contributes to overcoming the lack of role models, identified as another barrier (IRENA, 2019; UNESCO, 2017). Creating visibility and providing role models are both instrumental for achieving networks' goal of sparking girls interest in STEM, which in turn links to a third hurdle, namely the lower share of women among STEM graduates (IRENA, 2019; UNESCO, 2017), but also counteracts the conceptualisation of

STEM and energy as male domains (Fraune, 2015; Standal et al., 2020). Another identified hurdle is the lack of access to information, including regarding job openings (Baruah, 2018; IRENA, 2019) which women's networks tackle by aiming to share information and provide good entry points into the energy sector, but also through their own job platforms mentioned in the previous sub-chapter. Spreading career information more broadly was identified as a solution (IRENA, 2019), but the networks' role in connecting employees with employers valuing (gender) diversity was not mentioned in the literature.

Besides getting more women into the sector, women's networks also wish to support the female employees that are already working there. GWNET, e.g., mentioned its ambition to reduce alienation from the STEM field through mentoring. This links to Pearl-Clancy & Feenstra's (2019) vision of women's networks contributing to a more supportive work environment and reducing the feeling of isolation. Instrumental in this undertaking and a goal on its own is networks' vision of members mutually supporting each other. This envisioned exchange of experience and knowledge also requires trust among members, which some networks explicitly identify as a goal. The emphasis on mutual help and trust and the various educational offers, including mentoring, align with Emmons Allison et al.'s (2019) analysis that women seek more profound relationships and more training opportunities compared to men within networks.

However, networks' goals are not limited to supporting individual women through mutual help and trainings; they also strive for changes of the work environment. They advocate for a better work-life or career-family balance, thereby contributing to dismantling the unsupportive work environment described as yet another barrier for women by Pearl-Martinez & Stephens (2016). Another important aspect of the work environment is the salary, with networks fighting for equal pay, which is underpinned by studies identifying a gender-pay gap in the energy sector (IRENA, 2019; IRENA & ILO, 2022; Pearl-Martinez & Stephens, 2016). According to IRENA (2019, p. 42) reasons for it include "women's greater concentration in lower-paying, non-

technical and administrative jobs and in junior positions; women's comparatively weaker negotiating positions; their greater likelihood of taking time off from their careers for parenting and ; and the attitudes and values of employers. In addition, differences may in some cases be the result of pay discrimination". Besides making explicit demands for equal pay, women's networks also contribute to reduce inequalities by pushing women's careers and attracting them to higher-paying technical jobs, and they may support individual women, e.g., through negotiation training,

The goals of women's networks go beyond creating a more gender-balanced workforce and good working conditions. They also wish to advance women's rights more generally and some women's networks explicitly try to influence policies, which could contribute to overcoming the gender-blindness of policies, criticised by feminist energy researchers (Clancy & Feenstra, 2019; Mang-Benza, 2021). Four of them also declared their intention to influence the energy transformation. Interestingly, those are three of the energy networks and only one of the RE networks, but that does not mean that the others have no impact, as the next sub-chapter will illustrate.

1.4 Do they have an impact on the German energy transformation? And if yes, which impact do they have and how do they achieve it?

From the many results presented in the previous chapter, it can be concluded that the analysed women's networks do indeed have an impact on the German energy transformation. Their specific tools have already been introduced above, so this sub-chapter will focus more on the general way in which they influenced the transformation.

Windfang, the energy cooperative, represents an exception because it directly influences the energy transformation through RE production. Although the quantity of electricity produced today may be irrelevant in comparison to the total national energy production, the cooperative can be considered a forerunner in RE, with its first windmill being constructed in 1995.

Windfang did not only inspire institutions and civil society in the vicinity of their power plants to follow suit and produce RE, but it also offered women a space to gain experiences in the field, which they later applied elsewhere, including in new RE businesses some of them founded. It can thus be argued that in the case of Windfang, in terms of impact, the energy production is more of a tool and the bigger impact is achieved through the members and inspired neighbours, although both are interdependent. This impact is unique to the model of an energy-producing women’s network, but other more traditional networks also have an indirect influence through their members. Firstly, because members can ask topical questions within the professional networks, and they will incorporate the answers into their work, which for some is in the energy or RE sector. Secondly, networks help their members advance in their careers through professional networking, learning opportunities, and mutual support. Interviewee II even found one of her jobs through the network. This indirect influence on the energy transformation through members is most prominent for energy networks, but members of STEM networks may also work in the energy sector or research it.

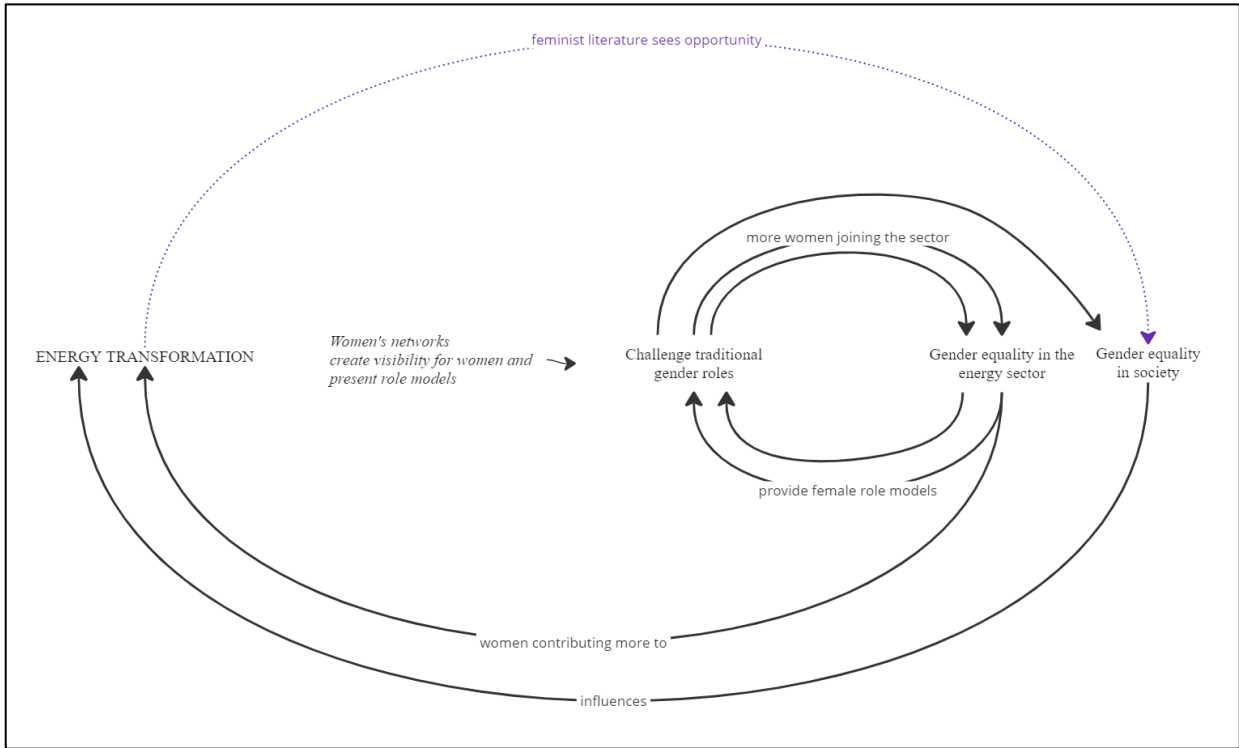


Figure 3: Virtuous cycle representing important interconnected impacts of women's networks on the energy transformation

The most important impact of women's networks, which was also the main goal described in the literature (IRENA, 2019) is their contribution to increasing the share of women in the energy sector. As was already discussed in the form of goals in the previous sub-chapter, women's networks create visibility for women and present role models, which counteracts stereotypes and traditional gender roles and the lack of role models, described as entry barriers for women (Baruah, 2018; IRENA, 2019; UNESCO, 2017). Thanks to their work, more women choose and stay in STEM and energy, according to the interviewees. For them, their networks reduce frustration and make women feel good by connecting them to each other and enabling exchange and support. This resonates with the literature blaming the feeling of isolation and a lack of support for women leaving the STEM field and envisioning networks and mentoring to foster a supportive community (Clancy & Feenstra, 2019; Pearl-Martinez & Stephens, 2016). Windfang, through its energy production, again plays a special role in so far as the cooperative always asks for female workers and usually their wish is granted. This offers the female employees a possibility to showcase their capacities, brings attention to the topic, and creates a demand for female workers. Lastly, women's networks increase the share of female leaders in the sector by through supporting their members' careers, which can contribute to further increasing the share of women, because, as businessman Anand Mahindra argues, "when you have a woman CEO in the company, miraculously, that pool emerges, and you get more women. Women hire other women" (Alves, 2018).

Both, interviewees and the literature acknowledge that increasing the share of women has further repercussions on the energy sector and thus, the energy transformation. Interviewee II mentioned that she learnt that 20% are sufficient for the minority to become visible and impact a system or organisation. IREAN (2019) differentiates between the level for the minority to become visible, which according to them is reached at a share of 15% and the level necessary for the minority to be influential, set at 30%. According to interviewee V, the participation of

women is necessary to create a holistic system that considers the needs of all people affected by it and makes it more efficient by increasing the understanding of when energy is used and what for. Considering that a quarter of the energy produced within the EU is consumed for household tasks that are still predominantly carried out by women (Carroll, 2022), the interviewees' assessment that different people have different perspectives on energy consumption is strengthened, and the importance of a female perspective is underlined. Interviewee V highlighted that theoretically speaking, everyone can advance women's issues, like pregnant women being the first to die of a lack of energy access in refugee camps because instruments cannot be sterilized for C-sections, which she gave as an example. She explained that "[i]t does not necessarily have to be women, but mainly these are women because it is a reality, you know?" (Interview V, Pos. 34). This makes it even more evident and important to increase the share of women. Yet, the critique by Clancy & Feenstra (2019), that equal numbers do not equal gender justice, should be acknowledged. They criticise the idea that the topic of gender equality should not be left to women alone and underline that women are a heterogeneous group. Another important impact of increasing the share of women, according to interviewee V, is to reduce sexism. Similarly, interviewee I argued that connecting women to each other helps to reveal patterns and thereby identify discrimination of women as such. Both aspects can be argued to be instrumental in dismantling the barrier of women fearing sexual harassment and thus not joining the sector (Baruah, 2017).

Increasing the share of women also benefits the sector itself in several ways: Three interviewees put forward the idea that women can bring in new perspectives and thus provide valuable, innovative input for the energy sector. This is supported by the literature, which criticises the lack of women as unused potential (Clancy & Roehr, 2003) and affirms that diversity enhances creativity and innovation (Carroll, 2022; Pearl-Martinez & Stephens, 2016). Researchers further acknowledge that women are more environmentally conscious due to their socialisation

(Clancy & Feenstra, 2019; Emmons Allison et al., 2019). On the one hand, this means that, as already mentioned in the introduction, women represent an increasing share of RE customers, and thus hiring women can benefit companies by helping them better understand their target group (Emmons Allison et al., 2019). If networks contribute to increasing the share of women, they may thus indirectly contribute to expanding RE capacities by making RE solutions more appealing to consumers. This is particularly important in the case of Germany, where citizens hold a large share of RE sources (BMU, 2011) and privately owned PV systems are responsible for the current expansion of solar energy (Schill et al., 2023). On the other hand, female leaders may push towards transforming the energy sector from within, given that, according to Emmons Allison et al. (Emmons Allison et al., 2019, p. 36) “[...] women’s corporate leadership is associated with investments in renewable energy, commitments to reducing greenhouse gas emissions, and efforts to minimize environmental risks associated with finances”. Interestingly, even though it may seem like one of the most evident and direct impacts and is commonly discussed in the literature (Baruah, 2017; Clancy & Feenstra, 2019; Lucas et al., 2018), only one interviewee mentioned the skill shortage. Nevertheless, increasing the share of women can contribute to reducing the lack of workers, firstly by enlarging the talent pool as described in the literature (Chaumont et al., 2021; Czako, 2020) and secondly, by making the sector more attractive to work in also for men, e.g., through better support of parents and more flexibility. Workforce for the sector may also be gained by networks that make companies that value diversity visible. Based on the preceding analysis as well as interviewee I and IRENA’s (2019) reasoning that androcentricity, i.e., the perception of male perspectives as the human norm (Hibbs, 2014), created the barriers for women to enter and succeed in the energy sector, it can be argued that increasing the share of women will create a virtuous cycle of more women joining the sector and making it more appealing for them by reducing the male focus and thus the barriers.

Interviewee V also argues that women's networks are largely responsible for raising the issue of energy and gender. This is interconnected with the topic of increasing the share of women, but it exceeds the domain of the energy workforce and thereby the expectations of the authors mentioned in the Literature overview. Furthermore, according to interviewee IV, women's networks "[...] help to ensure that the energy transition is just, leaves no one behind, that the benefits and costs it generates are shared equitably between women and men, and that the future energy system is designed by and for everyone, including women" (Interview IV, pos. 11). Although only one of the networks calls itself feminist, this analysis of interviewee IV clearly aligns with the vision of feminist energy systems introduced in the Introduction. This aspect is particularly important in times of wavering support for the energy transformation and challenges in making and communicating the German energy transformation as socially just (Huneke et al., 2024).

It should, however, be underlined that, with the exception of GWNET, the energy networks do not put the intersection of gender and energy or a socially just energy transformation at the forefront of their communication. Interviewee V's observation and the statement by interviewee IV may be influenced by their respective collaboration with and work for GWNET. The website of this network includes the statement that "GWNET generates and disseminates information on the role of women in the energy transition with the goal of creating awareness, strengthening networks and ultimately influencing decision-making" (GWNET, pos. 51). However, other networks efforts for a gender-balanced workforce can also be considered to be one aspect of the gender-energy nexus. Their communication on the topic may serve as a starting point to analyse the intersection in more depth for diverse stakeholders, and the supported members of the networks may individually discuss and contribute to a socially just energy transformation.

Another key impact of women's networks, which has an impact on the energy transformation and beyond, is the challenging of gender roles and stereotypes. Before looking at its impacts, it

seems important to highlight that networks not only challenge them socially by providing role models and showcasing women in ‘untraditional’ roles and occupations, but also on a personal level by offering their members spaces to reflect upon, question and potentially unlearn their socialisation. This personal dimension is illustrated by the examples of coaching sessions on the topics of the insignia of power and rope teams by interviewee II. By challenging gender roles, more women can potentially contribute to the energy transformation as employees but also as participants in citizen initiatives, because besides money a major hurdle for women in this regard are stereotypes and the perception of technology as a male domain (Fraune, 2015; Standal et al., 2020). In the German context, this is again particularly impactful because privately owned RE sources play such an important role in RE production (BMU, 2011; Schill et al., 2023). Additionally, this can bring about more fundamental societal changes, with women claiming and occupying different and more spaces, including in technology and leadership positions, and care responsibilities being redefined. This societal change, in turn, can influence the energy transformation because, as highlighted in the introduction, technology and society are closely interwoven (Bell et al., 2020; Mang-Benza, 2021). It also connects to the presented eco-feminist definition of sustainability, consisting of “challenging unjust power relations” (Odrowaz-Coates, 2021, p. 10). Challenging gender roles is a big undertaking, and to achieve it, networks collaborate with many other stakeholders, also pushing their topics, which may again be unrelated to the energy sector.

Although interviewees only provided personal definitions of the energy transformation and on their websites, networks did not give comprehensive definitions of their understanding of the energy transformation, it can be concluded that they do have an impact on it, as interviewee V also highlighted. However, they achieve their main impact indirectly through their members and by increasing the share of women, which in turn is connected to them challenging traditional gender roles. The key interconnections between the important impacts of women’s

networks on the energy transformation are visualised in Figure 3: Virtuous cycle representing important interconnected impacts of women's networks on the energy transformation.

Limits and future research

The assessment of the role of women's networks included in the previous sub-chapter refers to the analysed networks as a whole and in general. The specific role and impact of each network individually could not be studied in depth, although it is briefly touched upon in their respective fact sheets. Similarly, due to time constraints, it was also not possible to further analyse the different categories of women's networks introduced in this thesis, namely STEM networks, energy networks, and RE networks, in order to understand their similarities and differences.

Only five interviews with people from different networks were carried out. The results are thus not representative of the interviewee's networks and certainly not of all women's networks. Additionally, due to the low number of interview partners, the interviewed people were diverse. This had been an intentional choice in order to enable a broad overview over the impact of different women's networks'; yet it also made the analysis of the results more challenging because not only did the interviewees discuss their experiences within different networks, but they also held different roles within them and thus had different perspectives on the networks. The results of the interviews should thus be understood as personal illustrations and an addition to the more generic information provided on the website. They should not be misunderstood as a representative survey. Although the personal definitions of energy transformation have been included in this work, no statement on whether the interviewees' membership in women's networks has influenced these definitions can be made.

The explorative, qualitative research design was chosen because only limited data on the topic existed in the literature. In combination the analysis of the websites and the semi-structured interviews represent a starting point for analysing the role of women's networks. The data clearly supports the idea that women's networks have an influence on the German energy

transition. However, the importance of their impact cannot be clearly described or quantified. Although the importance of collaborations has been underlined in the present thesis, the focus of the analysis remained on the women's networks themselves. Their work was not explicitly linked to the influence of other important actors, like policymakers or consumers.

Women's networks represent an interesting unit of analysis because they link to many different aspects of the gender-energy nexus, but that also means that large amounts of data were produced, which opened up many potential analyses and discussions that could not or only briefly included in this work. This is true, e.g., for the different views on technology by the dib and Women in Technology touched upon in the chapter on Results. Another important topic that did not get enough attention was intersectionality. Gender is only one lens through which to look at the energy system (Pearl-Martinez & Stephens, 2016) and it is only one characteristic defining a person and their experiences (Bögel et al., 2023). Gender is however a very important lens, as also interviewee V pointed out, because it transcends all populations and intersects with other dimensions of discrimination, e.g., women are more prone to poverty, including energy poverty (Carroll, 2022).

Another limitation of this study is the fact that it remains within the binary categories of man and woman. The reason has been explained at the beginning of the literature overview and the continuous discrimination of people socialised and perceived as women (EIGE, 2023) justifies studying the challenges and potentials of women specifically. Nevertheless, it should be acknowledged again that more than two genders exist and future data collection and research will hopefully reflect this.

Conclusion

The climate crisis is already impacting societies worldwide and the necessity to reduce emissions from the energy sector, which on its own accounts for almost three quarters of the global GHG emissions (Friedrich et al., 2020), is acknowledged by scientists and policymakers

alike. Feminist energy literature does, however, criticise the fact that the social dimensions of this transformation in general and the gender-energy nexus in particular are not sufficiently studied and acknowledged especially in the Global North (Bell et al., 2020; Fraune, 2015; Mang-Benza, 2021). In their opinion, the full participation of women in the energy sector would not only benefit the sector, but they describe it as a question of fairness and equity. One suggested tool to empower women is women's networks. Hence, this thesis aimed to explore the role women's networks play in the German energy transition as an exemplary case. The research was guided by the following questions:

- 1.1. Which women's networks are active in the German energy sector?
- 1.2. How do those women's networks function?
- 1.3. What are they working for?
- 1.4. Do they have an impact on the German energy transformation? And if yes, which impact do they have and how do they achieve it?

To answer the research questions, a content-structuring qualitative content analysis was applied to data collected from the websites of women's networks and five semi-structured interviews. A total of fourteen women's networks fulfilling the selection criteria had been identified. Eight of them were classified as energy networks, including three RE networks, and six of them connected women from STEM fields. The women's networks were very diverse in their size and geographic scope, ranging from about 60 to 250,000 members from a single country to more than 179 countries. The literature suggested that their role would be to connect women and support them in order for female employees to succeed in the energy sector and inspire others, thereby also increasing the overall share of women in the field. The benefits of women's participation identified in the literature range from reducing the lack of skilled workers and improving the economic performance of companies to women providing new perspectives and creating a better work atmosphere (Clancy & Feenstra, 2019; IRENA, 2019; Pearl-Martinez &

Stephens, 2016). Through networking events and platforms, trainings, and mentoring, as well as showcasing inspiring women and assigning awards, the identified women's networks strived to improve the gender balance in the energy sector. The personal stories from the interviews illustrated that they, at least in the described instances, succeeded in attracting and retaining women in the sector.

However, this work also illustrates that women's networks' impact exceeded the realm of the energy workforce. The analysis revealed that they create diverse alliances with other stakeholders to advance a variety of topics, including but not limited to gender equality and sustainability. Especially through their role in creating visibility for women and women's topics, as well as their training offers, women's networks can also spark more fundamental societal and personal changes with regards to gender roles. This can trigger further changes, like more girls choosing a career in STEM or men taking over more paid and unpaid care work. Given that the societal dimension shapes the energy transformation, these changes in society could again have repercussions for the energy sector. These reciprocal effects can be described as a virtuous cycle between women's networks challenging gender roles, including for the sake of gender equality within the energy sector, which in turn challenges existing gender roles, e.g., if women occupy technical or leadership positions.

With regards to the energy transformation in general, the role of women's networks seen as a unit of diverse associations can be described as a catalyst for change. They achieved their main impact not by directly intervening in the energy transformation but rather indirectly through their members and increasing the share of women and creating visibility for them. In fact, the results of this thesis suggested that women's networks offered women a place to exchange and learn; they empowered them individually to become agents of change; and they tried to open up spaces for women on a structural level so that they would be able to achieve an impact and succeed in their careers. Furthermore, the analysis revealed that women's networks connected

employers and potential female employees and helped companies become more diverse and inclusive, thereby fostering innovation. By supporting companies, women's networks could potentially promote the sale of RE. Moreover, by advancing female careers, they could further push the development towards a gender-balanced workforce and RE sources. Their indirect influence is also illustrated by the fact that most women's networks do not focus on a socially just energy transformation or the gender-energy nexus in their communication, but usually push women's career options and working conditions and the benefits for their individual female members to the forefront.

Nevertheless, statements by the interviewees and the presented analysis suggest that women's networks could contribute to a truly sustainable energy transformation as envisioned by feminist energy literature. They bring attention to and empower women so that their specific perspective can be included and a holistic energy system serving the people and preserving the environment can be created collectively. Through their efforts to create visibility for women, they shed light on the gender-energy nexus and can contribute to breaking the vicious cycle of little attention being paid to it and limited data being collected.

More research is needed to assess the impact of individual networks and specific tools and to understand how important the influence of women's networks is. One specific aspect in this regard, which came up in different contexts in the literature and the collected data, would be the financial resources of women's networks. This dimension seems particularly interesting because women still earn and accumulate less money (Fraune, 2015) and interviewees also mentioned money as a limiting factor for the work of their networks. To better understand their role, large-scale surveys with members of women's networks could be used to create representative data and determine the impact of women's networks on the sector and individuals, including their understanding of the energy transformation. Another interesting aspect for future research is education. Given that women's networks are involved in training

opportunities for women and understand the necessities of the energy sector, it would be interesting to investigate whether they had suggestions for the reform of university curricula, that has been proposed by IRENA (2019). Additionally, women's networks may also be able to provide input for including green education in lower and higher education as envisioned by Bray et al. (2022) and ensure that the gender-dimension is incorporated, because some of the networks already have experience with educational offers for girls. This would require a close collaboration with other stakeholders. This very relationships with other stakeholders like policymakers, universities, and companies and how those stakeholders perceive women's networks and their impact represent another potential research field. For the German context, it would be particularly interesting to further investigate if an increased involvement of women's networks could help to restore the partially lost support for the energy transformation among citizens. Moreover, future studies should go beyond the binary gender categories and also explore the intersection of genders and other aspects of social identity with regards to energy and networking.

References

- Adams, F., Aruzza, F. C., Bhattacharya, T., & Fraser, N. (2020). Feminism for the 99%: A Manifesto. *Feminist Legal Studies*, 28(1), 101–105. <https://doi.org/10.1007/s10691-019-09408-z>
- Allen, E., Lyons, H., & Stephens, J. C. (2019). Women's leadership in renewable transformation, energy justice and energy democracy: Redistributing power. *Energy Research & Social Science*, 57, 101233. <https://doi.org/10.1016/j.erss.2019.101233>
- Althoff, E., Dambeck, H., Falkenberg, H., Wünsch, A., Wünsch, M., Ziegenhagen, I., Maurer, C., Willemsen, S., Dröscher, T., Heilmann, F., Lenck, T., Müller, S., & Saerbeck, B. (2022). *Climate-neutral power system 2035 (Executive Summary)—How the German power sector can become climate-neutral by 2035*. Agora Energiewende. <https://www.agora-energiewende.org/publications/climate-neutral-power-system-2035-summary>
- Alves, G. (2018, November 7). Anand Mahindra bats for more women in boardrooms; says 10 pc hike in girls' education can up GDP by 3 pc. *The Economic Times*. <https://economictimes.indiatimes.com/magazines/panache/tired-of-whatsapp-spam-new-update-allows-blocking-users-directly-from-lock-screen-heres-how/articleshow/107602359.cms>
- Baruah, B. (2017). Renewable inequity? Women's employment in clean energy in industrialized, emerging and developing economies. *Natural Resources Forum*, 41(1), 18–29. <https://doi.org/10.1111/1477-8947.12105>
- Baruah, B. (2018). Barriers and Opportunities for Women's Employment in Natural Resource Industries in Canada. *Natural Resources Canada Long-Term Cross-Sectoral Economic and Policy Research Agenda*. https://www.academia.edu/39431981/Barriers_and_Opportunities_for_Women_s_Employment_in_Natural_Resource_Industries_in_Canada

- Bell, S. E., Daggett, C., & Labuski, C. (2020). Toward feminist energy systems: Why adding women and solar panels is not enough. *Energy Research & Social Science*, 68, 101557. <https://doi.org/10.1016/j.erss.2020.101557>
- Bisso Bi Mba, E. M., Netzeband, G., Musekamp, I., Netzel, K., Kuchling, S., Weiß, U., Grobys, N., & Wenz, S. (2021). *Strategy paper: She Drives Energy—Network of Women in Energy Technology*. <https://dgmk.de/themen/she-drives-energy-network-of-women-in-energy-technology/> [marked as ¹ in **Error! Reference source not found.** in the annex]
- BMU. (2011). *Entwurf: Erfahrungsbericht 2011 zum Erneuerbare-Energien-Gesetz (EEG-Erfahrungsbericht)*. https://www.bhkw-infozentrum.de/download/eeg_erfahrungsbericht_2011_entwurf.pdf
- BMWK. (n.d.). *Der Weg in unsere Energiezukunft*. Weg zur Klimaneutralität. Retrieved 6 January 2024, from <https://info.bmwk.de/weg-zur-klimaneutralitaet>
- Bögel, P. M., Trenks, H., Upham, P., Sauter, H., Albiez, M., Stelzer, V., & Laborgne, P. (2023). Diversifying power in action: A socio-psychological approach to inclusive energy transition experiments. *Energy Research & Social Science*, 100, 103070. <https://doi.org/10.1016/j.erss.2023.103070>
- Bray, R., Mejía Montero, A., & Ford, R. (2022). Skills deployment for a ‘just’ net zero energy transition. *Environmental Innovation and Societal Transitions*, 42, 395–410. <https://doi.org/10.1016/j.eist.2022.02.002>
- Bundesregierung. (2022, April 27). *Elimination of EEG levy relieves electricity consumers*. Website of the Federal Government | Bundesregierung. <https://www.bundesregierung.de/breg-en/news/renewable-energy-sources-act-levy-abolished-2011854>
- Bündnis 90/Die Grünen, FDP, & SPD. (2021). *Mehr Fortschritt wagen—Bündis für Freiheit, Gerechtigkeit und Nachhaltigkeit. Koalitionsvertrag 2021-2025 zwischen SPD, BÜNDNIS 90/DIE GRÜNEN und FDP*. <https://www.spd.de/koalitionsvertrag2021>

- Calvin, K., Dasgupta, D., Krinner, G., Mukherji, A., Thorne, P. W., Trisos, C., Romero, J., Aldunce, P., Barrett, K., Blanco, G., Cheung, W. W. L., Connors, S., Denton, F., Diongue-Niang, A., Dodman, D., Garschagen, M., Geden, O., Hayward, B., Jones, C., ... Péan, C. (2023). *Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (First, pp. 1–85). Intergovernmental Panel on Climate Change (IPCC). <https://doi.org/10.59327/IPCC/AR6-9789291691647>
- Carroll, P. (2022). Gender Mainstreaming the European Union Energy Transition. *Energies*, 15(21), Article 21. <https://doi.org/10.3390/en15218087>
- Chaumont, S., Charalampidis, I., Demkova, D., Melgar, F., & Naffah, E. (2021). *ASSET study on collection of gender-disaggregated data on the employment and participation of women and men in the energy sector*. Publications Office of the European Union. <https://data.europa.eu/doi/10.2833/888421>
- Clancy, J., & Feenstra, M. (2019). *Women, Gender Equality and the Energy Transition in the EU*. Publications Office of the European Union. <https://doi.org/10.2861/750279>
- Clancy, J., & Roehr, U. (2003). Gender and energy: Is there a Northern perspective? *Energy for Sustainable Development*, 7(3), 44–49. [https://doi.org/10.1016/S0973-0826\(08\)60364-6](https://doi.org/10.1016/S0973-0826(08)60364-6)
- Claudia, K. (2022, November 11). *Wir bezahlen den Preis für die verschleppte Energiewende*. bpb.de. <https://www.bpb.de/shop/zeitschriften/apuz/energiepolitik-2022/515188/wir-bezahlen-den-preis-fuer-die-verschleppte-energiewende/>
- Climate Analytics, & NewClimate Institute. (2023, September 5). *Germany*. Climate Action Tracker. <https://climateactiontracker.org/countries/germany/>
- Czako, V. (2020). *Employment in the energy sector: Status report 2020*. Publications Office of the European Union. <https://data.europa.eu/doi/10.2760/95180>

- Danner-Schröder, A., & Müller-Seitz, G. (2017). 3.3 Interviews führen. In *Qualitative Methoden in der Organisations- und Managementforschung—Ein anwendungsorientierter Leitfaden für Datensammlung und -analyse* (1st ed.). Franz Vahlen. <https://doi.org/10.15358/9783800653300>
- DGMK. (n.d.). *She Drives Energy—Network of Women in Energy Technology*. DGMK. Retrieved 5 December 2023, from <https://dgmk.de/themen/she-drives-energy-network-of-women-in-energy-technology/>
- dib. (n.d.-a). *dib Positionspapier—Handlungsaufforderungen*. Retrieved 10 December 2023, from <https://www.dibev.de/standpunkte.html> [marked as ⁴ in **Error! Reference source not found.** in the annex]
- dib. (n.d.-b). *dib Positionspapier—Vereinsprofil*. Retrieved 10 December 2023, from <https://www.dibev.de/standpunkte.html> [marked as ¹ in **Error! Reference source not found.** in the annex]
- dib. (n.d.-c). *dib Positionspapier—Vision des deutschen Ingenieurinnenbundes*. Retrieved 10 December 2023, from <https://www.dibev.de/standpunkte.html> [marked as ² in **Error! Reference source not found.** in the annex]
- dib. (n.d.-d). Deutscher Ingenieurinnenbund. Retrieved 5 December 2023, from <https://www.dibev.de/>
- dib. (2011). *deutscher ingenieurinnenbund e.v. - 25 jahre impulse*. <https://www.dibev.de/veroeffentlichungen.html> [marked as ³ in **Error! Reference source not found.** in the annex]
- EIGE. (2023). *Gender Equality Index 2023: Towards a green transition in transport and energy*. Publications Office of the European Union. <https://data.europa.eu/doi/10.2839/64810>
- Ely, R. J. (1995). The power in demography: women's social constructions of gender identity at work. *Academy of Management Journal*, 38(3), 589–634. <https://doi.org/10.2307/256740>

- Emmons Allison, J., McCrory, K., & Oxnevad, I. (2019). Closing the renewable energy gender gap in the United States and Canada: The role of women's professional networking. *Energy Research & Social Science*, 55, 35–45. <https://doi.org/10.1016/j.erss.2019.03.011>
- Ernst & Young GmbH Wirtschaftsprüfungsgesellschaft. (2023). *Fortschrittsmonitor 2023-Energiewende* (BKL 2304-047(22)). <https://www.bdew.de/media/documents/EY-BDEW-Fortschrittsmonitor-2023-Ed.pdf>
- eurostat. (2023). *Population change—Demographic balance and crude rates at national level* (demo_gind) [dataset]. Population and social conditions > Demography, population stock and balance > Main population indicators. https://ec.europa.eu/eurostat/databrowser/view/DEMO_GIND__custom_7127262/default/table
- Evans, S. (2016, September 21). *Zeitleiste: Die Vergangenheit, Gegenwart und Zukunft der deutschen Energiewende*. Carbon Brief. <https://www.carbonbrief.org/zeitliste-vergangenheit-gegenwart-zukunft-deutschen-energiewende/>
- Fathallah, J., & Pyakurel, P. (2020). Addressing gender in energy studies. *Energy Research & Social Science*, 65, 101461. <https://doi.org/10.1016/j.erss.2020.101461>
- Ferris, N. (2022, May 20). How can a wind turbine factory still be closing in Europe in 2022? *Energy Monitor*. <https://www.energymonitor.ai/tech/renewables/what-the-closure-of-germanys-only-wind-blade-factory-says-about-its-energy-transition>
- First Global Stocktake, (2023, December 13), FCCC/PA/CMA/2023/L.17. https://unfccc.int/sites/default/files/resource/cma2023_L17_adv.pdf
- Forret, M. L., & Dougherty, T. W. (2004). Networking behaviors and career outcomes: Differences for men and women? *Journal of Organizational Behavior*, 25(3), 419–437. Scopus. <https://doi.org/10.1002/job.253>

- Fraune, C. (2015). Gender matters: Women, renewable energy, and citizen participation in Germany. *Energy Research & Social Science*, 7, 55–65. <https://doi.org/10.1016/j.erss.2015.02.005>
- Friedrich, J., Ge, M., & Pickens, A. (2020, December 22). *3 charts that show which countries and which sectors emit the most greenhouse gas*. World Economic Forum. <https://www.weforum.org/agenda/2020/12/climate-change-greenhouse-gas-emissions-environment-paris-agreement/>
- FTA. (n.d.). Femtec.Alumnae e.V. – Technikbegeistert.Vernetzt.Engagiert. Retrieved 14 December 2023, from <https://www.femtec-alumnae.org/>
- Grönefeld, E. V. (2022). *Towards a gender-just energy transition in the European Union—An ecofeminist analysis of the Swedish, German, and Romanian NECPs* [Bachelor's thesis, Westfälische Wilhelms-Universität & University of Twente]. https://essay.utwente.nl/91878/1/Gr%C3%B6nefeld_BA_BMS.pdf
- GWNET. (n.d.). Global Women's Network for the Energy Transition. Retrieved 6 December 2023, from <https://www.globalwomennet.org/>
- GWNET. (2019). *Woman for Sustainable Energy: Strategies to Foster Woman's Talent for Transformational Change*. <https://www.globalwomennet.org/women-energy/>
- Hartz, K., Lenck, T., Müller, S., Godron, P., Zackariat, M., Heilmann, F., Hein, F., Metz, J., Hoppe, J., Kraus, A., Steitz, J., Weiß, U., Wieland, S., Saerbeck, B., Holl, M., Graf, A., & Maier, U. (2023). *Die Energiewende in Deutschland: Stand der Dinge 2022 - Rückblick auf die wesentlichen Entwicklungen sowie Ausblick auf 2023* (283/01-A-2023/DE; Die Energiewende in Deutschland). Agora Energiewende. <https://www.agora-energiewende.de/publikationen/die-energiewende-in-deutschland-stand-der-dinge-2022>
- Hibbs, C. (2014). Androcentrism. In T. Teo (Ed.), *Encyclopedia of Critical Psychology* (pp. 94–101). Springer. https://doi.org/10.1007/978-1-4614-5583-7_16

- Huneke, F., Hartz, K., Zackariat, M., Godron, P., Müller, S., Dusolt, A., Kraus, A., Fischer, C., Hoppe, J., Willems, M., Wenzel, M., Wauer, N., Weiß, U., Metz, J., Peter, F., Maier, U., & Klümper, W. (2024). *Die Energiewende in Deutschland: Stand der Dinge 2023 - Rückblick auf die wesentlichen Entwicklungen sowie Ausblick auf 2024* (317/01-A-2024/DE; Die Energiewende in Deutschland). Agora Energiewende. <https://www.agora-energiewende.de/publikationen/die-energiewende-in-deutschland-stand-der-dinge-2023>
- Hyder, S. (2017, August 29). *Why Do Professional Women Need Networking More Than Men?* Inc.Com. <https://www.inc.com/shama-hyder/professional-women-need-networking-more-than-men-h.html>
- Hypatia. (n.d.). Hypatia | Frauennetzwerk Erneuerbare Energien Und Cleantech e.V. |. Retrieved 10 December 2023, from <https://www.hypatia-network.de/>
- Hypatia. (2016). *Satzung des gemeinnützigen Vereins Hypatia – Frauennetzwerk Erneuerbare Energien und Cleantech e.V.* <https://www.hypatia-network.de/mitglied-werden>
- IASS. (n.d.). *Iass_soziales_nachhaltigkeitsbarometer_2022_web.pdf*. Retrieved 6 January 2024, from https://ariadneprojekt.de/media/2022/09/iass_soziales_nachhaltigkeitsbarometer_2022_web.pdf
- INWES. (n.d.). International Network of Women Engineers and Scientists. Retrieved 18 December 2023, from <https://www.inwes.org/>
- IRENA. (2019). *Renewable Energy: A Gender Perspective*. International Renewable Energy Agency. <https://www.irena.org/publications/2019/Jan/Renewable-Energy-A-Gender-Perspective>
- IRENA, & ILO. (2022). *Renewable Energy and Jobs—Annual Review 2022*. <https://www.irena.org/Publications/2022/Sep/Renewable-Energy-and-Jobs-Annual-Review-2022>

- Johnson, O. W., Han, J. Y.-C., Knight, A.-L., Mortensen, S., Aung, M. T., Boyland, M., & Resurrección, B. P. (2020). Intersectionality and energy transitions: A review of gender, social equity and low-carbon energy. *Energy Research & Social Science*, 70, 101774. <https://doi.org/10.1016/j.erss.2020.101774>
- Jungjohann, A., & Morris, C. (2014). *The German Coal Conundrum*: Heinrich Böll Foundation North America.
- Karakislak, I., Sadat-Razavi, P., & Schweizer-Ries, P. (2023). A cooperative of their own: Gender implications on renewable energy cooperatives in Germany. *Energy Research & Social Science*, 96, 102947. <https://doi.org/10.1016/j.erss.2023.102947>
- Kemfert, C. (2016, March 18). *Globale Energiewende: 'Made in Germany'?* bpb.de. <https://www.bpb.de/shop/zeitschriften/apuz/222980/globale-energiewende-made-in-germany/>
- Kuckarzt, U., & Rädiker, S. (2022). Die inhaltlich strukturierende qualitative Inhaltsanalyse. In *Qualitative Inhaltsanalyse. Methoden, Praxis, Computerunterstützung: Grundlagentexte Methoden* (5th ed., pp. 129–156). Beltz Juventa. https://content-select.com/media/moz_viewer/5e623532-20b8-4f33-b19e-4a1db0dd2d03/language:de
- Kuschan, M., Habersbrunner, K., Rühlemann, A., Krämer, M., & Friederichsen, P. (2020). *Frauen. Energie. Wende! - Warum wir eine geschlechtergerechte Energiewende brauchen*. Women Engage for a Common Future (WECF). <https://www.wecf.org/de/84729-2/>
- Laes, E., Gorissen, L., & Nevens, F. (2014). A Comparison of Energy Transition Governance in Germany, The Netherlands and the United Kingdom. *Sustainability*, 6(3), Article 3. <https://doi.org/10.3390/su6031129>
- Lucas, H., Pinnington, S., & Cabeza, L. F. (2018). Education and training gaps in the renewable energy sector. *Solar Energy*, 173, 449–455. <https://doi.org/10.1016/j.solener.2018.07.061>

- Mang-Benza, C. (2021). Many shades of pink in the energy transition: Seeing women in energy extraction, production, distribution, and consumption. *Energy Research & Social Science*, 73. <https://doi.org/10.1016/j.erss.2020.101901>
- Mies, M., & Shiva, V. (2022). *Ecofeminism*. Bloomsbury Academic.
- Miller, C. A., Richter, J., & O’Leary, J. (2015). Socio-energy systems design: A policy framework for energy transitions. *Energy Research & Social Science*, 6, 29–40. <https://doi.org/10.1016/j.erss.2014.11.004>
- Morton, A. (2023, December 16). Cop28 has finally named fossil fuels as the climate problem. But do leaders have the will to act? *The Guardian - Europe Edition*. <https://www.theguardian.com/environment/2023/dec/17/cop28-has-singled-out-fossil-fuels-as-the-climate-problem-but-do-leaders-have-the-will-to-act>
- Odrowaz-Coates, A. (2021). Definitions of Sustainability in the Context of Gender. *Sustainability*, 13(6862), Article 12. <https://doi.org/10.3390/su13126862>
- Öko-Institut e.V. (n.d.-a). *Energiewende: Geschichte, aktuelle Situation, Zukunft—Energiewende.de*. Energiewende.De. Retrieved 2 January 2024, from <https://www.energiewende.de/start>
- Öko-Institut e.V. (n.d.-b). *Ursprünge*. energiewende.de. Retrieved 3 January 2024, from <https://www.energiewende.de/urspruenge#>
- Pallavi, R. (2023, February 1). *These are the EU countries with the largest economies*. World Economic Forum. <https://www.weforum.org/agenda/2023/02/eu-countries-largest-economies-energy-gdp/>
- Papadimitriou, E., Casabianca, E., & Cabeza, M. B. (2023, February 13). *Energy poverty and gender in the EU: The missing debate*. JRC Publications Repository. <https://publications.jrc.ec.europa.eu/repository/handle/JRC132612>

- Paris Agreement, (2015, December 12), FCCC/CP/2015/10/Add.1.
https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en
- Pearl-Martinez, R., & Stephens, J. C. (2016). Toward a gender diverse workforce in the renewable energy transition. *Sustainability: Science, Practice and Policy*, 12(1), 8–15.
<https://doi.org/10.1080/15487733.2016.11908149>
- Porter, C. M., Woo, S. E., Alonso, N., & Snyder, G. (2023). Why do people network? Professional networking motives and their implications for networking behaviors and career success. *Journal of Vocational Behavior*, 142, 103856.
<https://doi.org/10.1016/j.jvb.2023.103856>
- PwC. (n.d.). *Women&energy – Das energiegeladene Frauennetzwerk!* PwC. Retrieved 19 December 2023, from <https://www.pwc.de/de/energiwirtschaft/women-and-energy-foerdert-frauen-in-der-energiwirtschaft.html>
- PwC. (2014). *Frauen in der Energiewirtschaft—August 2014*.
https://www.pwc.de/de/energiwirtschaft/assets/studienergebnisse_frauen-in-der-energiwirtschaft.pdf
- PwC. (2017). *Women&energy—Fünf Gründe, warum ein energiegeladenes Frauennetzwerk wichtig ist*. <https://www.pwc.de/de/energiwirtschaft/women-and-energy-fuenf-gruende-november-2017.pdf> [marked as ¹ in **Error! Reference source not found.** in the annex]
- PwC. (2018, June 28). *PwC-Studie: Anteil weiblicher Führungskräfte in der Energiewirtschaft seit 2014 kaum gestiegen*. PricewaterhouseCoopers.
<https://www.pwc.de/de/energiwirtschaft/pwc-studie-zeigt-anteil-weiblicher-fuehrungskraefte-in-der-energiwirtschaft-seit-2014-kaum-gestiegen.html>

- PwC. (2022). *Frauen in der Energiewirtschaft -Warum die Branche mehr Frauenpower braucht*. <https://www.pwc.de/de/energiewirtschaft/women-and-energy-foerdert-frauen-in-der-energiewirtschaft.html>
- Rosen, M. A. (2020). Sustainability: Concepts, Definitions, and Applications. In A. Alvarez-Risco, M. A. Rosen, S. Del-Aguila-Arcentales, & D. Marinova (Eds.), *Building Sustainable Cities: Social, Economic and Environmental Factors* (pp. 15–26). Springer International Publishing. https://doi.org/10.1007/978-3-030-45533-0_2
- Schill, W.-P., Roth, A., Guéret, A., & Schmidt, F. (2023). *Gemischte Halbzeitbilanz für Ampel bei Energiewende: Gute Fortschritte bei Photovoltaik, schwache Dynamik bei Elektromobilität und Windenergie* (90; DIW aktuell). Deutsches Institut für Wirtschaftsforschung. <http://hdl.handle.net/10419/280775>
- Schmid, E., Knopf, B., & Pechan, A. (2015). Putting an energy system transformation into practice: The case of the German Energiewende. *Energy Research & Social Science*, *11*, 263–275. <https://doi.org/10.1016/j.erss.2015.11.002>
- Standal, K., Talevi, M., & Westskog, H. (2020). Engaging men and women in energy production in Norway and the United Kingdom: The significance of social practices and gender relations. *Energy Research & Social Science*, *60*, 101338. <https://doi.org/10.1016/j.erss.2019.101338>
- The gender pay gap situation in the EU*. (n.d.). European Commission - An Official EU Website. Retrieved 14 January 2024, from https://commission.europa.eu/strategy-and-policy/policies/justice-and-fundamental-rights/gender-equality/equal-pay/gender-pay-gap-situation-eu_en
- The Women and Gender Constituency. (2017, November 8). *Windfang: A women's cooperative that projects, builds and runs wind turbines*. UN Climate Technology Centre & Network. <https://www.ctc-n.org/resources/windfang-women-s-cooperative-projects-builds-and-runs-wind-turbines>

- Transforming Our World : The 2030 Agenda for Sustainable Development, (2015, September 2015), A/RES/70/1. <https://www.refworld.org/legal/resolution/unga/2015/en/111816>
- UBA. (2024, January 19). *Endenergieverbrauch nach Energieträgern und Sektoren* [Text]. Umweltbundesamt; Umweltbundesamt. <https://www.umweltbundesamt.de/daten/energie/energieverbrauch-nach-energietraegern-sektoren>
- UNESCO. (2017). *Cracking the code: Girls' and women's education in science, technology, engineering and mathematics (STEM)*. UNESCO. <https://doi.org/10.54675/QYHK2407>
- UNFCCC. (2023, December 13). *COP28 Agreement Signals "Beginning of the End" of the Fossil Fuel Era*. United Nations Climate Change. <https://unfccc.int/news/cop28-agreement-signals-beginning-of-the-end-of-the-fossil-fuel-era>
- VDE. (n.d.). VDE ELektroingenieurinnen. Retrieved 13 December 2023, from <https://www.vde.com/de/elektroingenieurinnen/aufgaben-ziele>
- Verrax, F. (2019). Elinor Ostrom or the Revolution of the Commons. In T. Hoerber & A. Anquetil (Eds.), *Economic Theory and Globalization* (pp. 195–219). Springer International Publishing. https://doi.org/10.1007/978-3-030-23824-7_9
- WEC. (2020). Women's Energy Council. <https://energycouncil.com/how-it-works/womens-energy-council/>
- Wefing, H. (2021, April 29). Bundesverfassungsgericht: Daran kommt niemand mehr vorbei. *Die Zeit*. <https://www.zeit.de/politik/deutschland/2021-04/bundesverfassungsgericht-klimaschutzgesetz-justiz-urteil-klimaklage-freiheitsrechte-einschraenkung>
- Wilson, S. (2018). Energy Imaginaries: Feminist and Decolonial Futures. In B. R. Bellamy & J. Diamanti (Eds.), *Materialism and the Critique of Energy* (pp. 377–412). MCM. <https://www.mcmprime.com/books/marxism-and-energy>
- Windfang. (n.d.). Windfang eG - Frauen im Aufwind. Retrieved 18 December 2023, from <http://s477174211.website-start.de/über-uns/>

- WiT. (n.d.). Women in Tech e.V. - Deutschland, Österreich, Schweiz. Retrieved 16 December 2023, from <https://www.womenintechev.de/>
- WMO. (2023). *Significant weather and climate events in 2023* (Supplement to WMO Provisional State of the Climate 2023 Report, pp. 1–7). <https://wmo.int/sites/default/files/2023-12/Supplement.pdf>
- wom.e.n. (n.d.). Women.Energy.Network. Retrieved 7 December 2023, from <http://www.wom-e-n.de/>
- Women in Technology. (n.d.). Womentech Network. Retrieved 17 December 2023, from <https://www.womentech.net/>
- w.one. (n.d.). Women of New Energies. Retrieved 5 December 2023, from <https://womenofnewenergies.wildapricot.org/>

Annex

Fact sheets

Women & energy (energy network for leaders)			
Das energiegeladene Netzwerk – The network full of energy / Value by relationship			
<i>The German network for female leaders in energy focuses on expanding professional relations among women and make them more visible and influential.</i>			
Founding year	2010	Geographic extend	Probably Germany
Number of members	1000	Legal form	Unknown
Female members			
Women in leadership positions within companies of the energy industry and within industry associations, as well as young women who want to pursue a career in the sector			
Kinds of membership			
- Membership for individual women			
Partners			
Companies from the energy sector			
Sponsors			
PwC GmbH (main)	Others unknown		
Employed methods			
Presence at important events of the sector	Regular network meetings	Exchange knowledge and experiences	Support qualification and career development
Studies regarding ‘Women in German energy sector’			
Platforms			
None mentioned on website			
Main goals			
<ul style="list-style-type: none"> - Professional and personal development of members - Members mutually support each other professionally and personally by sharing their experiences and knowledge with each other - Equal opportunities in the energy sector - Increase women’s influence and the visibility of female leaders in the sector - Provide valuable input from a diverse group for the sector especially for the transformation of the energy system 			
History			
Founded by PwC GmbH WPG because historically few women reach senior positions within the energy sector and the networks aims to help making those who do more visible			
Energy transformation			
Acknowledge that the energy sector phases an upheaval and highlight that the women’s network can provide valuable input for the sector thanks by enabling professional exchange			
Sources			
Website: (PwC, n.d.) women & energy	Leaflet: (PwC, 2017) marked as ^{1*}		

*Because the transcripts cannot be edited and thus APA style quotes with brackets ‘(...)’ could not be included, foot notes were used in the transcript. If no source is specified in the transcript all data was copied from the website included in the reference list. If other sources have been used, they are marked with foot notes included in the fact sheets and the references.

She drives energy (energy network)			
Network of Women in Energy Technology			
<i>The small energy network aims to contribute to the energy transformation by establishing trustful and supportive relationships among women from the energy sector.</i>			
Founding year	Unkown	Geographic extend	German-speaking area
Number of members	~150	Legal form	Unknown
Female members			
Female students and technicians, scientists and engineers from the energy sector			
Kinds of membership			
Membership for individual women – Free of charge			
Partners			
wom.e.n. - Women. Energy.Network e.V.	#InnovativeWomen	Women in Tech e.V.	CIW ^{IN}
DGG - Equal Opportunities Committee			
Sponsors			
Mabanaft (gold)	ExxonMobil (gold)	SHELL (gold)	RWE
bp	wintershall dea		
Employed methods			
Own events at sector events	Newsletter	Digital exchange e.g. via chat function	Directive of members
Trainings: web seminars and ask-me-anything	Job shadowing and job exchange	School visits/present job to young girls	Study award
Podcast			
Platforms			
LinkedIn	X	Spotify	
Main goals			
<ul style="list-style-type: none"> - Support personal and professional development of members and advance their careers - Create a ‘lively and sustainable’ network establishing cross-sector connections - Provide a safe space for exchange, mutual learning and support, and inspiration among members to contribute to a successful and sustainable energy industry - Contribute to and shape the transformation towards a sustainable energy supply - Increase the visibility of women in the energy sector - Advance the STEM interest and education of girls and women 			
History			
The need for a network for women in the energy sector in the German-speaking area was identified and the DGMK was considered suitable for its establishment, because its purpose is to enable technical-scientific exchange in the energy sector and remains neutral.			
Energy transformation			
They identify the provision of “a sustainable and climate-neutral energy supply [... as] the challenge of our generation” and aim to “help to shape the change” towards it.			
Sources			
Website: (DGMK, n.d.) She Drives Energy		Strategy paper: (Bisso Bi Mba et al., 2021) marked as ¹	

W.one - Women of New Energies e.V. (RE network)			
<i>A German network exclusively for women from the RE sector that aims to improve the participation, leadership, visibility and working conditions of women in the field.</i>			
Founding year	2011	Geographic extend	Germany
Number of members	Unknown	Legal form	Registered association
Female members			
Women working in the RE sector			
Kinds of membership			
<ul style="list-style-type: none"> - Membership for individual women - Corporate membership – dependant on size 200 to 1000€/year 			
Partners			
Women Power congress	Women’s networks of the sector	Companies listed on website	BEE*
Erneuerbare Energien Hamburg*	Landesverband Erneuerbare Energien NW*	Husum Wind (trade fair)*	Stiftung Offshore Windenergie*
Sponsors			
None mentioned on website			
Employed methods			
Own events at trade fairs	Regular meetings for women and companies	Regular leadership circles	Assemblies of association
Member ‘speed dating’	Member app	Training for personal and professional development	Mentoring
Newsletter	Calendar on website	Formats on role models in the sector	
Platforms			
LinkedIn			
Main goals			
<ul style="list-style-type: none"> - Connect experienced leaders and young talents in RE and foster exchange - Support (young) women in their career and their personal development - Make companies that are committed to the advancement of women visible - Equal opportunities and participation for women in the RE sector - Increase the share of women in the RE sector (including in leadership positions) to reach a balanced gender ratio - Showcase the work of women in RE to the public - Good working conditions and entry opportunities into the RE sector - Better balance between family and career for men and women - Equal pay 			
History			
Original name ‘Women of Wind Energy Deutschland e.V.’			
Energy transformation			
Not mentioned			
Sources			
Website: (w.one, n.d.) women of new energies			

* Corporate members of the network

Wom.e.n. – Women.Energy.Network e.V. (energy network)			
<i>A small network for all women from the energy sector focusing on making the sector more attractive for women.</i>			
Founding year	Probably 2016	Geographic extend	Probably Germany
Number of members	> 60 (wish to grow)	Legal form	Registered association
Female members			
All women that work in any function in the energy sector			
Kinds of membership			
<ul style="list-style-type: none"> - Membership for individual women – Fee unknown - Supporting membership for individuals, companies, organisations – Fee unknown 			
Partners			
She Drives Energy	Hypatia e.V.	Desperate Workwives	
Sponsors			
None mentioned on website			
Employed methods			
Regular meetings of members	Assemblies of association	Training for personal and professional development	Joint presence at events of the sector
Wom.e.n. Energy award for companies	Refer female experts		
Platforms			
LinkedIn			
Main goals			
<ul style="list-style-type: none"> - Connect women from different disciplines to exchange knowledge and experience and foster innovative (business) ideas - Establish trustful personal and professional relationships among women and mutual support - Demand and realise equal opportunities and decision-making in the sector - Increase the share and the visibility of women especially in leadership positions in the energy sector - Equal pay - Better balance between family and career - Showcase the energy sector as an attractive field for women - Create an open, interdisciplinary and future-oriented (zukunfstfähig) energy sector - Breaking up long-established structures 			
History			
Founded by 15 founding members to create an independent platform for and by women to foster mutual help, attract more women to the sector and strengthen their position and visibility within it.			
Energy transformation			
Not mentioned			
Sources			
Website: (wom.e.n., n.d.) wom.e.n.			

GWNET – Global Women’s Network for the Energy Transition (energy network)			
<i>A global network for women from the energy sector that aims to contribute to the energy transformation through networking, empowering and advocacy off/for women.</i>			
Founding year	2017	Geographic extend	Global: >150 countries
Number of members	>3,500	Legal form	International non-profit organization
Female members			
Open to all women working in the energy sector			
Kinds of membership			
<ul style="list-style-type: none"> - Membership for individual women – Free of charge - Corporate membership for those identifying with the aims of GWNET – 1000€/a 			
Partners &			
Women’s networks	Companies		
Sponsors			
None mentioned			
Employed methods			
Own platform incl. chat	Directive of members	Dedicated events for members	Different mentoring programs
Training for personal and professional development	Showcase portraits of female energy transition leaders	Refer female experts through their profile on website	Studies/publications on women in the energy sector
Educational, outreach formats on gender-sensitive action for energy transformation		Present at events including COP28	
Platforms			
LinkedIn	X		
Main goals			
<ul style="list-style-type: none"> - Personal and professional, interdisciplinary and international exchange for women - Foster knowledge exchange and personal and professional development of members - Increase the share of women especially in technical fields and leadership positions in the energy sector and make them visible - Generate and disseminate information on obstacles for and potential of women in the energy transformation - Give visibility to companies committed to gender-equality and connect them to potential female employees - Connect regional women’s networks to each other - Contribute to gender-mainstreaming in the energy transition - Contribute to the energy transformation by connecting and empowering women - Foster equal opportunities and empower women to become change agents 			
History			
Created by four women working in the sustainable energy sector because of the male-domination of the sector and the potential of gender-diversity			
Energy transformation			
Focus on the topic, highlight that gender-diversity is indispensable for sustainability and aim to contribute to the energy transformation by empowering women			
Sources			
Website: (GWNET, n.d.) GWNET			

FTA - Femtec Alumnae e.V. (STEM network)			
Technikbegeistert.Vernetzt.Engagiert. – Technology enthusiastic.Connected.Committed			
<i>A network of women in STEM aiming to get more women (interested) in technology.</i>			
Founding year	2008	Geographic extend	Focus on Germany and Switzerland
Number of members	>1000	Legal form	Registered association
Female members			
Former scholarship holders of the Femtec Career-Building Programme and women with a STEM background			
Kinds of membership			
<ul style="list-style-type: none"> - Membership for individual women – 30 to 100€ depending on employment status - Supporting membership for women without STEM background and male allies - Honorary membership awarded by the board 			
Partners			
Universities and technical colleges	Trade fairs, congress and other events	Verband deutscher Unternehmerinnen	FidAR (Frauen in die Aufsichtsräte)
Companies	panda	Berliner Erklärung	Unternehmertum
EAF	Lafmaal foundation	Allbright	VAA
Centre for digital technology and management	Verband Fach- und Führungskräfte	Women automotive network	Zonta International Germany
Kidscircle.io	FeMentor	Fella	Picture a scientist
Sponsors			
Non mentioned other than supporting members			
Employed methods			
Regional groups with regular meeting	Social events for members	Training for prof. development	Mentoring with Zonta Club
FTA-conference	FTA felicitas award	Working groups	E-book: Frau macht
Girls macht MI(N)T	campaigns	Podcast	
Platforms			
LinkedIn and Xing	Instagram	Facebook	YouTube
Main goals			
<ul style="list-style-type: none"> - Connect women from diverse STEM fields to exchange knowledge and experience - Support the career of women in STEM through mutual support, trainings and expanding the professional network of women and supportive companies - Improve work-life balance and support each other in balancing family and career - Equal pay - Inspire more women and girls to pursue education and careers in STEM and people in general to challenge existing patterns and models - Promote equal rights, equal opportunities and diversity - Make the network in itself more sustainable and promote the SDGs 			
History			
Founded in 2008 by alumnae of the Femtec Career-Building Programme in Berlin			
Energy transformation			
Understanding how RE work is mentioned as one aspect of the ‘Girls macht MI(N)T’ days			
Sources			
Website: (FTA, n.d.) Femtec.Alumnae e.V.			

dib - Deutscher Ingenieurinnenbund e.V. (STEM network)				
Ohne Frauen fehlt der Technik was - Technology lacks something without women				
<i>A feminist network of women in STEM, discussing many topics with a focus on structural change to increase the share of women in STEM and improve their situation overall.</i>				
Founding year	1986	Geographic extend	Germany	
Number of members	400 (in 2011)	Legal form	Registered association	
Female members				
Female engineers and women with a background in STEM including university students				
Kinds of membership				
- Individual female members				
Partners				
Deutsche Frauenräte	Ingenieurkammer NI	INWES	WoMentor	
Competence centre Technik, Diversity, Chancengleichheit	European Platform of Women Scientists	Ingenieurinnen-netzwerk	Networks and other associations	
Sponsors				
For full list see: Referenzliste Sponsoren				
Employed methods				
Training for prof. development	Working groups	Assemblies of association	Magazine 'Die Ingenieurin'	
Own platform	Job platform	Formats to present job profile	Own congresses, panel discussions etc	
Present at trade fairs	Statements on current topics	Committee work	Lobbying	
Mother-daughter classes		Present at 'Girls days'		
Platforms				
Xing	Facebook	X		
Main goals				
<ul style="list-style-type: none"> - Support women in technical fields also through mutual aid among members - Foster personal development of members - Inspire young women and increase the share of women (leaders) in technical fields - Improve the working conditions of engineers and better work-life balance for all - Overcome gender roles in the professional and private domain to achieve a balanced gender ratio in STEM, paid and unpaid care work and leadership positions - Improve the situation of all women including through pushing for policy reforms regarding topics like abortions, taxes and quotas - Involve diverse people in technological developments to make use of their creative resources and thereby boost competitiveness - Showcase a critical perspective on technology, its structure and impacts 				
History				
Founded because female engineers felt alone as women among engineers and as engineers among female friends and within the women's movement, and wished for topical exchange				
Energy transformation				
It was the topic of the 2023 conference. For the future, they envision a combination of resource efficient technological products that preserve the environment and social solutions like sharing instead of owning and openly criticise the exaltation of technology.				
Sources				
Website: (dib, n.d.-d) dib	Profile: (dib, n.d.-b) as ¹	Vision (dib, n.d.-c) as ²	Leaflet: (dib, 2011) as ³	Demands: (dib, n.d.-a) as ⁴

WiT - Women in Tech e.V. (STEM network)			
<i>A network for women working in technology in the German speaking region focusing on increasing the diversity in the field to contribute to a more equal and just society.</i>			
Founding year	Unknown	Geographic extend	Germany, Austria and Switzerland
Number of members	Unknown	Legal form	Registered association
Female members			
All women working in technical fields			
Kinds of membership			
<ul style="list-style-type: none"> - Membership for individual women – 20€ or 10€ (reduced tariff) - Corporate membership - Supporting membership 			
Partners			
Companies	Educational institution	She Drives Energy	Bündnis für Frauen in Mint-Berufen
Women ai academy	start steps	# GoVersity	Jenna van Hauten
INCO academy	coding schule	ITgirls	thenewITgirls
Sponsors			
Supporting members (see: Kooperation)			
Employed methods			
Local events	WiT Lounge (online meeting)	Training for personal and professional development	Mentoring internal and in collaboration with partners
Blog	Videos	Present role models	
Platforms			
LinkedIn	YouTube	Instagram	Facebook and X
Main goals			
<ul style="list-style-type: none"> - Enable an easy and relaxed exchange between diverse members from career changers to experienced experts to share knowledge and experiences in technology - Represent interests of members - Increase the visibility of women in technological occupations to provide role models - Decrease hurdles for women in technology like the gender-pay gap to reduce the skill shortage in IT, expand ways of thinking and achieve better (economic) results - Increase diversity in technical occupational fields by changing ways of thinking and provide women with life-long learning opportunities - Educate and empower women in technology so that they in turn can contribute to advance women’s topics and strengthen societies - Achieve equal rights for man and women and overcome traditional gender roles 			
History			
Unknown			
Energy transformation			
Not mentioned directly, but could potentially be one of the topics that empowered women advance through their contribution			
Sources			
Website: (WiT, n.d.) Women in Tech			

Hypatia Frauennetzwerk Erneuerbare Energien und Cleantech e.V. (RE network)			
<i>A network for women in RE and cleantech that envisions a more gender-sensitive and gender-balanced sector and a different understanding of professional success.</i>			
Founding year	Latest 2015	Geographic extend	Probably Germany
Number of members	Unknown	Legal form	Registered association
Female members			
Women working in RE and cleantech or related industries			
Kinds of membership			
<ul style="list-style-type: none"> - Membership for individual women – 50€ or 30€/a (reduced tariff) - Supporting membership for natural and legal persons – 80€/a - Corporate membership – dependant on size of company 			
Partners			
None mentioned on website			
Sponsors			
None mentioned on website			
Employed methods			
Newsletter	Regular meetings	Summer academy	Mentoring
Training for prof. development	WiT Roadshow	Present at events of sector	Present role models in RE
Platforms			
None mentioned on website			
Main goals			
<ul style="list-style-type: none"> - Foster professional relationships and exchange of knowledge and experience between diverse women working in RE - Support professional development and careers of members - Increase the share of women in RE especially in STEM and leadership positions - Equal opportunities for women in their jobs and better working conditions for all - Challenge the understanding of professional success - Increase the awareness of gender-justice in economy, politics and society 			
History			
Not specified on website			
Energy transformation			
It is a network specifically for women in RE and cleantech, but they don't mention the energy transition on their website			
Sources			
Website: (Hypatia, n.d.) Hypatia		Association's statutes (Hypatia, 2016) Marked as 1	

WEC - Women's energy council (energy network for leaders)			
<i>An exclusive network for women in executive positions in the energy sector that focuses on business relations between women and an increasing diversity in the energy workforce.</i>			
Founding year	2014	Geographic extend	Global
Number of members	>2,300	Legal form	Unknown
Female members			
Women in senior executive positions and diversity and inclusion champions in energy			
Kinds of membership			
- Membership for individual women			
Partners			
Companies (list on website)			
Sponsors			
None mentioned on website (underline that they accept sponsorship, but remain 100%)			
Employed methods			
Live and virtual meetings	Own event at sector trade fair	Training for personal and professional development	Mentoring
Provide role models	Podcast		
Platforms			
None mentioned on website			
Main goals			
<ul style="list-style-type: none"> - Have fun together - Connect female senior executives and share information from partners within network - Present partnering companies as leaders in diversity and inclusivity - Advance diversity in the energy workforce and showcase its potential and benefits - Increase the visibility of women in the energy sector to inspire the next generation - Empower women and enhance their participation in the oil, gas and energy industries 			
History			
Launched by the Energy Council to promote the idea that diversity enhances business performance and should be an integral part of business strategy and planning.			
Energy transformation			
Do not mentioned it, nor do they specifically name RE, only 'oil, gas and energy industries'			
Sources			
Website: Women's Energy Council			

Windfang e.G. (RE cooperative)			
Frauen im Aufwind – Women on the rise (literally upwind)			
<i>A women-only energy cooperative that actively contributes to increasing the share of women and the share of RE in the energy sector.</i>			
Founding year	1991	Geographic extend	Germany
Number of members	>200	Legal form	Registered cooperative
Female members			
All women regardless of their profession			
Kinds of membership			
- Female cooperative member – 1500€/share			
Partners			
Cooperative association Weser-Ems e.V.	Bündnis Bürgerenergie e.V.	Women’s network PIA e.V.	Women’s networks
Sponsors			
No sponsors			
Employed methods			
Energy production from renewables	Donations		
Platforms			
None mentioned on website			
Main goals			
<ul style="list-style-type: none"> - Create and support women’s networks - Actively contribute to the energy transformation by producing energy from wind, sun and water support energy saving technologies like combined heat and power plants - Provide women with work experience in the sector and empower them to also utilise their competencies and experience elsewhere 			
History			
It was the first all female energy cooperative in Germany, founded by “a small group of German women with technical backgrounds, who had grown disillusioned with the unsupportive male-dominated working environment they had encountered in the energy sector [...]“ (Clancy & Feenstra, 2019, p. 30)			
Energy transformation			
They actively contribute to the energy transformation by producing energy from renewable sources and empower women to contribute to it			
Other			
Not a classical network as it actually goes beyond connecting women, but several people underlined that the network aspect is a key element of the cooperative especially in its origin and initial intent.			
Sources			
Website: (Windfang, n.d.) Windfang	(Clancy & Feenstra, 2019)		

INWES - International Network of Women Scientists and Engineers (STEM network)			
Building a better future worldwide			
<i>A large, international network of women in STEM with connections to the UN, that aims to advance women's education and influence in STEM for the good of all.</i>			
Founding year	2002	Geographic extend	International >60 countries
Number of members	>250,000	Legal form	Not-for-profit corporation
Female members			
Students and professional engaged in the practice or teaching of STEM or interested in it			
Kinds of membership			
<ul style="list-style-type: none"> - Membership for individual women – exact fee unknown - Network membership for networks or organisations of/supporting women in STEM - Institutional membership for post-secondary academic institutions 			
Partners			
UNESCO	ECOSOC	UNFCCC	UN Women
Commission for the Status of Women	Companies		
Sponsors			
None specified on website			
Employed methods			
The International Conference of Women Engineers and Scientists (ICWES)		Regional conferences	Advice on funding and sponsorship
Regional networks	Educational and Research Institute	Own events at sector events	Newsletter
Platforms			
LinkedIn	X	Facebook	YouTube
Main goals			
<ul style="list-style-type: none"> - Foster connections and exchange among individuals and organisations - Strengthen the member (organisations) to become an influential voice on STEM as a network and individually and collectively influence policies in STEM worldwide - Advance girls' and women's education especially in STEM - Increase the share of women in STEM including in decision-making - 'Build a better future' for all through enabling women to fully participate in STEM 			
History			
The World Conference on Science for the 21st Century in 1999 envisioned a network specifically for female scientists in its final declaration. With the support of UNESCO Canada, 20 women from 10 countries and 8 organisations prepared its creation, which was unanimously approved by delegates from 30 countries to the International Conference of Women Engineers and Scientists in 2002.			
Energy transformation			
Do not mentioned it specifically, but they aim to contribute to a better future for all and INWES organised the 'Energize Equity Roundtable' as an official side event of COP28			
Sources			
Website: (INWES, n.d.) INWES			

Women in Technology (STEM network)			
<i>A large, global network supported by many multi-national companies with different premium memberships aiming to increase the share of women in technology (leadership).</i>			
Founding year	Unknown	Geographic extend	Global > 179 countries
Number of members	>94,000	Legal form	Unknown
Female members			
All women working in technical roles			
Kinds of membership			
<ul style="list-style-type: none"> - Membership for individual women – three versions: free of charge, 289\$ and 699\$/a - Membership for companies and organisations - variable 			
Partners			
Coding girls foundation	Press and media	Companies (see Partners)	
Sponsors			
Only mention partners (see above)			
Employed methods			
Newsletter	Own platform incl. job platform	Meetings for members	Career advice and mentoring
Training for personal and professional development	Awards and scholarships	Conferences incl. diversity talks	Clock ‘Close economic gender gap’
Media content	Donations		
Platforms			
LinkedIn	Instagram	Facebook and X	YouTube
Main goals			
<ul style="list-style-type: none"> - Create a safe and inclusive space for diverse members to connect - Members should have fun together - Promote women’s personal and professional development and their professional relationships to advance their careers - Through educating and empowering members, they are enabled to create inclusive and diverse spaces everywhere and contribute to impactful and inclusive technology - Make women in technology more visible to inspire young women - Increase the share of women in technology including in leadership positions and thereby make the industry more inclusive and diverse - Connect women and companies aiming for inclusivity and diversity - Achieve gender-equality with the help of technology - Be the leading global network for women in technology in the long-term - “Promote ownership and accountability through informed decision-making” 			
History			
“[...] a global community powered by Coding Girls, Tech Family Ventures and Tallocate”			
Energy transformation			
They do not mention it on their website, but state that they commit to the UN SDGs.			
Other			
As employers they promote efficient time management and a remote-first culture to reduce travelling and thereby emissions and offer their employees more flexibility and a better work-life balance. They want to keep only people that are constantly striving for excellence			
Sources			

Website: (Women in Technology, n.d.) Women in Technology			
VDE e.V. Elektroingenieurinnen (STEM network)			
<i>A small network of female electrical engineers and information technologists within the VDE, who want to inform about their job and increase the share of women in their field.</i>			
Founding year	1987	Geographic extend	Germany
Number of members	Unknown Wish to grow	Legal form	VDE is a registered association
Female members			
Female engineers (electrical engineering and information technology)			
Kinds of membership			
- Membership for individual women – unknown			
Partners			
Educational institutions	Job centres	Initiative Frauen in Naturwissenschaften	IEEE Women in Engineering
Institution of Engineering and Technology		Competence centre Technik, Diversity, Chancengleichheit	
Sponsors			
None mentioned on website			
Employed methods			
Career advice	Training for prof. development	Mentoring	Information about job profile
Study award	School visits and girls‘-tech days		
Platforms			
None specific for ‘Elektroingenieurinnen’ only VDE in general			
Main goals			
<ul style="list-style-type: none"> - Connect members and foster exchange - Support the professional and personal development of members - Advance the technological competencies of girls - Inform about the job as electrical engineers from different perspectives and about entry options and inspire women to become engineers - Support young female talents, make them visible and contribute to Germany’s need of skilled workers - Inform about options to balance family and career - Challenge stereotypes and prejudices about women in electrical engineering and information technology 			
History			
The network was formed as a committee by female members of the VDE e.V. and still exists within that larger network for electrical engineers and information technologists			
Energy transformation			
Not mentioned on website			
Sources			
Website: (VDE, n.d.) Elektroingenieurinnen			

Coding handbook

1. Words

- 1.1. independent and neutral
- 1.2. sustainable
- 1.3. Energiewende/energy transformation

2. Number

3. Name

4. Interviewee

Information on the interviewee including their name, profession, education and membership in networks

4.1. BEE

5. Structure

Information about how the network is organised. In comparison to the category approach the structure focuses on the formal way in which the organisation itself is structured, while approach looks at through which activities the networks pursues its goals.

Includes information on partners, sponsors... because that is part of how the network is organised

5.1. Members

5.1.1. Number of members

5.1.1.1. Wish to grow

5.1.2. Who can join

Including all information on the criteria regarding who can become a member and who can take part in events of the network.

5.1.2.1. Corporations

5.1.2.2. Individual female members

5.1.3. Kinds of membership

Information on the different types of membership for different natural and judicial persons.

5.1.4. Fee

Costs of the membership for the potentially various kind of members and available reduced tariffs.

5.1.5. How to join

Information on the process of joining the network and who decides membership demands.

5.2. Non-member beneficiaries

5.2.1. Girls

5.3. Partners

Information on all organisations, networks and people the network is collaborating with

5.3.1. Support women's networks

5.3.2. Collaboration

5.3.2.1. Certificate for partners

5.3.2.2. Make companies more diverse

5.3.2.3. Wish to increase collaboration

5.3.2.4. Promotion

5.3.2.4.1. Promote network

5.3.2.4.2. Make companies known

5.3.2.4.2.1. Sponsoring

5.3.2.4.3. Promote each other

5.3.2.4.3.1. Platform for promoting networks

5.3.2.4.3.2. Social media

5.3.2.4.4. Internationally

5.3.2.4.4.1. Not Germany

5.3.2.4.5. Collaborative actions

5.3.2.4.5.1. Training

5.3.2.4.5.2. Campaigns

5.3.2.4.5.2.1. Press and media

5.3.2.4.5.2.2. Women Energize Women

5.3.2.4.5.2.3. Campaign DAX board members

5.3.2.4.6. Make topic heard

5.3.2.4.6.1. Ambassadors

5.3.2.4.6.2. Education for girls

5.3.2.4.6.3. Achieve gender equality in technology

5.3.2.4.6.4. Support others

5.3.2.4.7. Shared events

- 5.3.2.4.7.1. Conferences
- 5.3.2.4.7.2. With companies
 - 5.3.2.4.7.2.1. MINT Dialog
- 5.3.2.4.7.3. Panel at COP
- 5.3.2.4.8. Acquire members
 - 5.3.2.4.8.1. Next generation
- 5.3.2.4.9. Go beyond own field
 - 5.3.2.4.9.1. Meet other women
- 5.3.2.4.10. Part of
 - 5.3.2.4.10.1. Get invited to big events
 - 5.3.2.4.10.2. Chamber of engineers
 - 5.3.2.4.10.3. Women's Councils
- 5.3.2.4.11. Invite experts
- 5.3.2.5. Contact with partners
 - 5.3.2.5.1. Members in both organisations (+)
- 5.3.2.6. List of partners
 - 5.3.2.6.1. Sponsors

Information on sponsors i.e. who supports the network with funds

5.4. Initiation

Information on who initiated the network and their reasons to do so

5.4.1. Founding year

5.4.2. History

5.5. Legal form

Information on what legal form the network takes including mainly whether the network is a registered association or not and if it is non-profit status is recognized

5.6. Organs

Information on which organs exist, their formal composition (but not who currently holds which position), which functions they fulfill within the network and how they work

5.6.1. Women working for and within network

5.7. Geographic scope

Information on where the network is operating, where it was initiated and where its members are from

5.7.1. Geographic impact

6. Approach

Information about how the network tries to achieve its goals and proposed strategies and actions to be taken by other actors.

6.1. Slogan

6.2. General approach

Information on the approach, that are not specific methodes, tools they use

6.2.1. Feminist

6.3. Methods

List and definitions of specific activities the networks offers and tools they use to achieve their goals

6.3.1. Outreach

6.3.1.1. Influence

6.3.1.1.1. Lobbying

6.3.1.1.2. Statements/positions

6.3.1.2. Suggestions for other actors

Information on ideas, suggestions and demands for specific other actors; i.e. approaches to achieve their goals, for which they consider others to be responsible for the implementation and merely provide information, ideas...

6.3.1.3. Outreach tools

6.3.1.3.1. Scientific studies

6.3.1.3.2. Blog

6.3.1.3.3. Videos

6.3.1.3.4. Podcast

6.3.1.3.5. Media

6.3.1.4. Platforms

6.3.1.4.1. Digitalisation speeded up by Covid

6.3.1.4.2. List of platforms

6.3.1.4.2.1. Linked-In

6.3.1.5. Presenting the job

6.3.1.5.1. Downloadable documents

6.3.1.5.2. Schools

6.3.1.5.3. Job shadowing

6.3.2. Present at events of the sector

6.3.2.1. Own offerings

6.3.3. Own big events

6.3.4. Role models

Also a method

More detailed information on their understanding of being a role model and in which ways they try to inspire certain people (mainly young girls and women)

6.3.4.1. Refer female experts

6.3.4.2. Events for girls

6.3.4.3. E-book

6.3.4.4. Campaign

6.3.4.5. Awards

6.3.4.5.1. External award

6.3.4.5.2. Study award

6.3.4.6. Internal knowledge transfer

6.3.5. Network

6.3.5.1. Exchange knowledge and experience

6.3.6. Education

6.3.6.1. Mentoring

Also a method

More detailed information on the mentoring program, who can take part in it, when does it start, how many people did participate...

6.3.6.1.1. Outside of network

6.3.6.1.2. Mentors

6.3.6.2. Career advice

6.3.6.3. Trainings

6.3.6.3.1. Personal development

6.3.6.3.2. Professional training for members

6.3.7. Job platform

6.3.8. Energy production

6.3.9. Money

6.3.9.1. Donations

6.3.10. Creative approaches & tools on website

6.3.11. Internal exchange & contacts

Information on the exchange between members and how and where it takes place; as well as the traditional "networking" in the sense of building contacts

- 6.3.11.1. Member app
- 6.3.11.2. E-Mail
- 6.3.11.3. Job exchange
- 6.3.11.4. Website
 - 6.3.11.4.1. Own platform
 - 6.3.11.4.2. Calendar and news
 - 6.3.11.4.3. Directory of members
 - 6.3.11.4.4. Chat
- 6.3.11.5. Newsletter
 - 6.3.11.5.1. Magazine
- 6.3.11.6. Meetings
 - 6.3.11.6.1. Connecting with employers
 - 6.3.11.6.2. Official meetings of association
 - 6.3.11.6.3. Internal connecting
 - 6.3.11.6.3.1. Sub-groups for meetings
 - 6.3.11.6.3.1.1. Regional
 - 6.3.11.6.3.1.1.1. Inter-regional connection
 - 6.3.11.6.3.1.2. Thematic
 - 6.3.11.6.4. Input
 - 6.3.11.6.5. Social events

6.4. Explanations

Explanations as to why certain approaches, methods and tools were chosen and information on the benefits of those methods as well as explanations of the general approach and/or who can join

6.5. Uniqueness

Information on the specificities of the network, what distinguishes them from others, what makes them unique

7. Goals

Information about what the network tries to achieve. This may sometimes overlap with the approach e.g. connecting women may be considered a goal in itself as well as an approach to reach further goals. In such cases the code can be included in both categories.

Included on websites as vision, mission, goal or described as "what the networks offers you", benefits of the network. It can also include negative examples and challenges, with the goal being to remove those problems.

7.1. Goals for network

7.1.1. Persist successfully

7.1.1.1. Funding

7.1.2. Relationship within the network

All goals related to the relationships within the network itself like building trust or supporting each other

7.1.2.1. Exchange

7.1.2.1.1. Knowledge exchange

7.1.2.1.2. Build connections

7.1.2.2. Fun

7.1.2.3. Inclusiveness

7.1.2.3.1. Diversity & interdisciplinarity

7.2. Benefits for the individual female members

All goals specific for the individual members themselves. How does the network help its members?

Here I refer exclusively to the female natural persons, that are part of the network, not organisations or companies that are members or supporting members etc.

Although each individual also may benefit from structural change, this goal focuses exclusively on the individuals

7.2.1. Reputation

7.2.1.1. Increase visibility

7.2.2. Financial benefits

7.2.2.1. Profits

7.2.3. Development of members

7.2.3.1. Professional

7.2.3.2. Personal

7.2.4. Connect

7.2.4.1. Make voices heard

7.2.4.2. Access to senior professionals

7.3. Benefits for other members & partners

All goals for other members a part from the core group mentioned above, like partner organisations and participating companies.

7.3.1. Women's networks

7.3.2. Companies

7.3.3. Girls

7.4. Changing energy sector

All goals and visions for changing the energy sector in terms of its structures, underlying principles and actors. This is not limited to aspects of gender equality but can also include other aspects of change like enhancing the use of renewable energy. The goals and vision can reach from very specific measures to overarching concepts.

7.4.1. Equal opportunities

7.4.1.1. Awareness of gender dimension

7.4.2. Working conditions

All information related to working conditions in the sector. This is not limited to gender aspects, but also other minorities and overall changing work practices and the work environment.

Similar to changing energy sector, however this is more specific as it looks mainly at the companies and very specific measures like paid parental leave, while changing energy sector looks more at the structural changes and things beyond gender justice.

7.4.2.1. Life quality of employees

7.4.2.1.1. Work environment

7.4.2.1.2. Feeling well

7.4.2.1.3. Work-life balance

7.4.2.1.3.1. Career and family

7.4.2.2. Entry points

7.4.2.3. Equal pay

7.4.3. Attract women

7.4.3.1. Connect employees and employers

7.4.3.2. STEM

7.4.3.3. Education for girls and women

7.4.4. (Energy) transformation

7.4.4.1. Define energy transformation

Information on women's networks claim to define and shape the energy transformation. This is related to the sub-category changing the energy sector, but while that sub-category looks at envisioned changes and ideas for the future of energy more broadly, this sub-category regards women's networks' explicitly stated demand to generally speaking influence the

transformation of the energy system

This sub-category can contain information on the general claim to influence the energy transformation as well as specific aspects (e.g. gender-sensitivity) of this claim.

7.4.4.1.1. Personal definitions

7.4.4.1.1.1. Intersectional

7.4.4.1.1.2. Link to climate

7.4.4.2. Contribute to the energy transformation

Information on the different ways in which women's networks claim to contribute to the energy transformation like by fostering innovation, or expanding the talent pool

Only code explicitly stating the goal of contributing to the energy transformation is included in this category, however this doesn't mean that other networks and aspects of their work do not contribute to the energy transformation.

7.4.4.2.1. Ways of contributing

7.4.4.2.1.1. Provide input

7.4.4.2.1.1.1. Information

7.4.4.2.1.1.2. Influence decision making

7.4.4.2.1.1.3. Creativity and innovation

7.4.4.2.1.1.4. Connect women

7.4.4.2.1.2. Produce RE

7.4.4.2.1.3. COP

7.4.4.2.1.4. Need collaboration

7.5. Female participation & leadership

All goals related to increasing the number of female leaders and their influence i.e. participation in decision-making of women in the energy sector

7.5.1. Participate

7.5.1.1. Gender balance

7.5.1.2. Equal opportunities

7.5.1.3. Influence decisions

7.5.2. Visibility

7.5.2.1. Personal visibility

7.5.2.2. Common presentation

- 7.5.2.3. Visibility of network
- 7.5.2.4. Be present
- 7.5.2.5. Refer experts
- 7.5.2.6. Recognition
- 7.5.2.7. Why it matters
 - 7.5.2.7.1. Role model
- 7.5.2.8. Leadership
 - 7.5.2.8.1. Female careers
 - 7.5.2.8.2. More women in senior positions
 - 7.5.2.8.2.1. Few female leaders
 - 7.5.2.8.3. Support female leaders
 - 7.5.2.8.3.1. Visibility for female leaders

7.6. Societal change

Including all goals that go beyond changing specific aspects within the energy sector and the work in that sector. This includes aspects of changing the perception of the energy sector within society, but also regards broader societal conceptions especially on gender and work like traditional role models, typical male and female jobs, and the importance of work and sustainability

- 7.6.1. Job and career
- 7.6.2. Stereotypes and gender roles
 - 7.6.2.1. Women and technology
 - 7.6.2.2. Balance image of male leadership
 - 7.6.2.3. Women's rights
 - 7.6.2.3.1. Equal opportunities and diversity
 - 7.6.2.4. Challenge models and habits
- 7.6.3. Beyond network and sector
 - 7.6.3.1. Sensitize stakeholders
 - 7.6.3.2. Critique of technology
 - 7.6.3.3. Influence on policies

8. Networks of and for women

Includes all information on what makes networks of women necessary and what distinguished them from other networks

- 8.1. Definition of network (+)
 - 8.1.1. Not only women's networks

- 8.1.1.1. Other women's networks
- 8.1.1.2. Co-operative
- 8.1.1.3. Trade's association
- 8.1.2. Specificities women's networks
- 8.1.3. Link to energy sector
- 8.2. Differences
 - 8.2.1. Different target groups
 - 8.2.1.1. Topical support
 - 8.2.1.2. See what others do
- 8.3. Necessity
 - 8.3.1. Safe space
 - 8.3.2. Community
 - 8.3.2.1. Support
 - 8.3.2.1.1. Topical/professional exchange
 - 8.3.2.1.2. Strengthen each other
 - 8.3.2.1.3. Get advice
 - 8.3.2.2. Feel good
 - 8.3.2.2.1. Connect through different topics
 - 8.3.3. Value of network
 - 8.3.3.1. Meet inspirational women
 - 8.3.4. Awareness & advocacy
 - 8.3.4.1. Role model

9. Women working in the energy sector

Includes all statements regarding women in the energy sector including information on their representation, hurdles, solutions

- 9.1. Share of women
 - 9.1.1. Why it matters
 - 9.1.1.1. Better economic performance
 - 9.1.1.2. Shouldn't have to ask
 - 9.1.1.3. Design for all
 - 9.1.1.3.1. Efficiency
 - 9.1.1.3.2. Holistic system for all
 - 9.1.1.3.2.1. When energy is needed
 - 9.1.1.3.2.2. C-section

- 9.1.1.4. Inspiring
 - 9.1.1.4.1. Reduce sexism
- 9.1.1.5. Lack of exchange
- 9.1.2. History
 - 9.1.2.1. Historically low
 - 9.1.2.2. Increased already
 - 9.1.2.2.1. Increasing to slowly
- 9.1.3. Varies according to rank
- 9.1.4. Varies according to field
 - 9.1.4.1. RE better
 - 9.1.4.2. Technology
 - 9.1.4.3. Company
 - 9.1.4.4. Project management
 - 9.1.4.4.1. Flexibility
 - 9.1.4.4.2. Young sector
 - 9.1.4.5. Outside energy
- 9.2. Barriers
 - 9.2.1. Education
 - 9.2.2. Lack of supportive structures
 - 9.2.3. Lack of role models
 - 9.2.4. Stereotypes
 - 9.2.5. Not specific to energy
 - 9.2.6. Reasons for barriers
 - 9.2.6.1. Androcentricity
- 9.3. Solutions
 - 9.3.1. Many good approaches
 - 9.3.2. Exchange
 - 9.3.3. Awareness
 - 9.3.4. Structural change
 - 9.3.4.1. Society
 - 9.3.4.1.1. Role models
 - 9.3.4.1.2. Stereotypes
 - 9.3.4.1.2.1. Workplace
 - 9.3.5. Specific actions

- 9.3.5.1. Coaching
- 9.3.5.2. Mentoring
- 9.3.5.3. Advertisements
- 9.3.5.4. STEM education in school
- 9.3.5.5. Company kindergarten
- 9.3.6. Policies
- 9.3.7. Women's networks potential
 - 9.3.7.1. Offers
 - 9.3.7.1.1. Awareness
 - 9.3.7.1.1.1. Visibility of women
 - 9.3.7.1.1.1.1. Being present
 - 9.3.7.1.1.1.2. Recognition of women
 - 9.3.7.1.2. Learning
 - 9.3.7.1.2.1. Knowledge transfer
 - 9.3.7.1.2.2. Training
 - 9.3.7.1.3. Build connections
 - 9.3.7.1.3.1. Mutual support
 - 9.3.7.1.4. Advance women's careers
 - 9.3.7.2. Depends on type of network

10. Gender

Includes all statements on the impact of gender, "typical man and women" and socialisation of genders

- 10.1. No typical male, typical female
 - 10.1.1. Variety of women
- 10.2. Socialisation
 - 10.2.1. Financial independence
 - 10.2.2. Socialisation of women
 - 10.2.3. Socialisation of man
- 10.3. Women issue (not) by women
- 10.4. Allow men in networks
- 10.5. Intersectionality
 - 10.5.1. Gender as important aspect

11. Impact

All the effects of networks described by interview partners or stories mentioned on the

websites. The difference to goals is that impact describes observed or experienced results, while goals are ideas and visions of what the network would like to achieve.

- 11.1. People reached
 - 11.1.1. Mentees
- 11.2. Hope for impact
- 11.3. Why most important impact
- 11.4. Individual (+)
 - 11.4.1. No/limited impact
 - 11.4.2. Safe space
 - 11.4.2.1. Space for exchange
 - 11.4.2.1.1. Innovative ideas
 - 11.4.2.1.2. Learn
 - 11.4.2.1.2.1. Capacity building
 - 11.4.2.1.2.1.1. Try things out
 - 11.4.2.1.2.1.1.1. Get stronger in arguments
 - 11.4.2.1.2.1.1.2. Soft skills
 - 11.4.2.1.2.1.1.3. Produce RE
 - 11.4.2.1.2.1.2. Training
 - 11.4.2.1.2.1.2.1. Rope team
 - 11.4.2.1.2.1.2.1.1. Reduce competition
 - 11.4.2.1.2.1.2.1.2. How language works
 - 11.4.2.1.2.1.2.2. Insignia of power
 - 11.4.2.1.2.1.3. Mentoring
 - 11.4.2.2. Clap each other on the back
- 11.4.3. Job & career
 - 11.4.3.1. Find job
 - 11.4.3.2. Helpful for job
 - 11.4.3.2.1. Get recommendations
 - 11.4.3.2.1.1. Topical questions
 - 11.4.3.2.1.2. Personal recommendations
 - 11.4.3.3. Stay in field
 - 11.4.3.4. Advance career
 - 11.4.3.5. Broker contracts
- 11.4.4. Connect

- 11.4.4.1. Networking
 - 11.4.4.1.1. Build professional network
 - 11.4.4.1.2. Meet people
 - 11.4.4.1.2.1. Diversity of women
 - 11.4.4.1.2.1.1. Age/job situation
 - 11.4.4.1.2.2. Meet inspirational people
 - 11.4.4.1.3. Reach back/out
 - 11.4.4.2. Feel good
 - 11.4.4.2.1. Reduce frustration
 - 11.4.4.2.2. Feel less alone
 - 11.4.4.2.3. Energising
 - 11.4.4.3. Support if you move
 - 11.4.4.4. Visibility on individual level
- 11.5. Energy sector
 - 11.5.1. No/limited impact
 - 11.5.1.1. Difficult to measure
 - 11.5.2. Energy transformation
 - 11.5.2.1. Interdisciplinary exchange
 - 11.5.2.2. Innovative ideas
 - 11.5.2.3. Personal recommendations
 - 11.5.2.4. Part of the transformation
 - 11.5.2.4.1. Produce RE
 - 11.5.2.4.2. Indirect impact through employees
 - 11.5.2.5. Make it just & inclusive
 - 11.5.2.5.1. about sustainability
 - 11.5.2.5.1.1. Internally
 - 11.5.2.5.1.2. Raise awareness
 - 11.5.2.5.2. Push RE
 - 11.5.2.5.2.1. Inspire others
 - 11.5.3. Bring women into sector
 - 11.5.3.1. Better working conditions
 - 11.5.3.2. Benefits of mixed teams
 - 11.5.3.3. STEM
 - 11.5.3.3.1. More female engineers

- 11.5.3.4. Gendered dimension
 - 11.5.3.4.1. Benefits for the energy sector
 - 11.5.3.4.1.1. Success of industry
 - 11.5.3.4.1.1.1. Economic benefits
 - 11.5.3.4.1.1.2. Input
 - 11.5.3.4.1.1.2.1. Innovation
 - 11.5.3.4.1.1.3. Part of strategy
 - 11.5.3.4.1.2. Lack of workers
 - 11.5.3.4.1.3. Working atmosphere
 - 11.5.3.5. Ask for women
 - 11.5.3.6. Recognize discrimination
 - 11.5.3.7. Acknowledgment of gender dimension
 - 11.5.3.7.1. Hold accountable
- 11.6. Society
 - 11.6.1. Limited/no impact
 - 11.6.1.1. Difficult to pinpoint
 - 11.6.2. Visibility
 - 11.6.2.1. Visible at big events
 - 11.6.2.2. Visibility as 'Frauenförderung'
 - 11.6.3. Role model
 - 11.6.3.1. Increasing
 - 11.6.4. Make issues heard
 - 11.6.5. Women as agents of change
- 11.7. Geography of impact
- 11.8. Expand impact
 - 11.8.1. Better promotion
 - 11.8.1.1. Already before studies
 - 11.8.1.2. Policy makers reading studies
 - 11.8.1.2.1. Pertinent studies
 - 11.8.2. Collaborate
 - 11.8.3. Future of networks

12. Perception

Information about how the networks are perceived and how they perceive themselves

12.1. Own perception

12.1.1. Limited of resources

12.1.1.1. Limits of volunteers

12.2. Positive

12.2.1. Appreciate work

12.3. Perception by partner

12.3.1. Important

12.3.2. Positive feedback

12.3.3. Relationship

12.3.3.1. Supportive

13. Other

Important information that cannot be sorted into any of the other categories.

13.1. Quota

13.1.1. 20%

13.2. Not just women

13.3. Energy cooperatives

13.3.1. Who is involved

13.4. Competition

13.5. Understanding questions

13.5.1. Future of energy

Interview guidelines

Interviews I – III with women's networks

Introduction

- Thank you
- Set the context
 - My name – student
 - BA thesis
- Formalities
 - Anonymity (clarified in advance, check again)
 - Structure of the interview

- Duration
- Ask for permission to record

Interview questions

Introductory questions

- 1) Introduction of the interviewee
 - a. Could you briefly introduce yourself?
 - b. (Which women's networks are you part of?)
- 2) Introduction of the network
 - a. Could you very briefly introduce the network(s)?
 - i. What are the main goals of the network(s)?
 - ii. Who can join the network(s) and how?

Women in the energy sector

- 3) Female workers in energy sector
 - a. What do you think about the representativeness of women working in the energy sector??
 - i. What are the specific characteristics of the energy sector that may lead to that?
 - ii. How could the share of women be increased?
 - b. For you, what would be the main potentials of women's networks regarding gender balance?
 - c. Optional: (Why do you think, that participation of women in the energy sector is important?)

Women's networks

- 4) Why is the establishment of networks specifically for women necessary? / Why is it important?
- 5) History of network*
 - a. Who established it and why?

Role of the network

- 6) Impact of the network
 - a. How would you describe the impact of the women's network(s)?

- i. What would you consider the biggest/most important impact of each of the women's networks you are part of?
(Other answers can refer to women's network in general or one specific network)
- ii. What is the impact on you individually?
- iii. What is the impact on the energy sector?
- iv. What is the impact on society at large?
- v. What is the geographic extend of the impact?
- b. How could the impact of women's networks be further expanded?
 - i. What are your hopes for the future of the network?

7) Interactions with other actors

- a. With which other actors do you interact?
 - i. How do you interact?
 - 1. Which means do you use?
 - 2. How regularly do you interact?
 - ii. How is your relationship with other actors from the energy sector?*
 - iii. How are you (in your opinion) perceived by other actors?*

Energy transformation

8) Goals

- a. What are the networks goals for the future of energy? / What is the networks vision?
- b. In which ways can the network contribute to the future of energy?

9) Understanding of energy transformation

- a. What does energy transformation mean to you/the network?
 - i. What changes will (have to) occur?
- b. How are networks contributing to a transformation of energy?

Final remarks interviewee

- 10) Do you have any final remarks? Anything you would like to elaborate or something we haven't touched upon, that you consider important?

Conclusion

- Thank you
- Will be in touch for transcript

*Only for interviewee I, working for a network, not interviewee II and III, which were members of networks

Interview IV

The interview questions included in the interview guideline for interview I-III were sent to interviewee IV, with the request to answer some of the questions. The interviewee provided a statement discussing the following questions:

For you, what would be the main potentials of women's networks regarding gender balance?

Why is the establishment of networks specifically for women necessary? / Why is it important? In which ways can the network contribute to the future of energy?

Interview V with a representative of the BEE e.V.

Introduction (same as Interview I-IV)

The interviewee expresses her personal opinion and does not speak on behalf of the organisations.

Interview questions

Introductory questions

- 1) Introduction of the interviewee
 - a. Could you briefly introduce yourself?
- 2) Introduction of the organisation
 - a. Could you very briefly introduce the organisation(s) you are a part of?
 - i. What are its/their main goals?
 1. Women Energize women: Focus on Germany or international?

Women in the energy sector

- 3) Female workers in energy sector
 - a. What do you think about the representativeness of women working in the energy sector?
 - i. What are the specific characteristics of the energy sector that may lead to that?
 - ii. How could the share of women be increased?

- b. For you, what would be the main potentials of women's networks regarding gender balance?
- c. Optional: (Why do you think, that participation of women in the energy sector is important?)

Women's networks

- 4) Optional: (Why is the establishment of networks specifically for women necessary? / Why is it important?)

Role of women's networks

- 5) Impact of the network
 - a. How would you from an outside perspective assess the impact of the women's networks?
 - i. What would you consider the biggest/most important impact of women's networks?
 - b. How could the impact of women's networks be further expanded?
- 6) Interactions
 - a. Do you interact with women's networks?
 - i. With which networks do you interact?
 - ii. How do you interact?
 - 1. Which means do you use?
 - 2. How regularly do you interact?

Energy transformation

- 7) Understanding of energy transformation
 - a. What does energy transformation mean to you/your organisation?
 - i. What changes will (have to) occur?
 - b. Optional: (Are networks contributing to a transformation of energy? If yes, how?)

Final remarks interviewee

- 8) Do you have any final remarks? Anything you would like to elaborate or something we haven't touched upon, that you consider important

