



Brokering Gender Empowerment in Energy Access in the Global South

SPECIAL COLLECTION:
ENERGY, EMERGING
TECHNOLOGIES AND
GENDER IN HOMES

RESEARCH

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ABSTRACT

How do energy professionals in the Global South facilitate the brokerage of gender equity and empowerment in energy access? Energy sector professionals, including planners and members of non-governmental organisations (NGOs), are crucial development actors in off-grid contexts. They operate at the intersection between grassroots-level energy access in off-grid household and community buildings and overarching policy frameworks. However, despite their central role, the relationship between their professional practices and gender empowerment in energy access has received little attention. This paper investigates ‘energy brokers’ across Ghana, India, Nigeria and Pakistan based on interviews ($n = 86$). Subsequent thematic analysis explores these energy brokers’ overarching understandings of gender equity and empowerment, their agency, and brokering practices for energy access (including in relation to emerging energy technologies). Analysis shows ‘differentiated brokerage’ in that energy professionals from the NGOs and the delivery sectors are often better positioned to broker gender equity and women’s empowerment in energy access. However, linkages between equitable access and empowerment need to be better understood, especially at the ‘top’ and go beyond women’s economic productivity. Women’s participation across supply chains of emerging energy-access technology, in energy governance and as energy brokers needs strengthening.

PRACTICE RELEVANCE

Energy professionals occupy an important ‘middle’ position and can help to create changes to overcome gender bias in access to energy. They facilitate the brokerage (understandings, agency and practices) of gender equity and empowerment in energy access in off-grid contexts, including household and community buildings. The evidence

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KEYWORDS:

brokerage; development;
energy; equity; gender; homes;
intermediaries; professional
practices; Global South

TO CITE THIS ARTICLE:

Schiffer, A., Greene, M., Khalid, R., Foulds, C., Vidal, C. A., Chatterjee, M., Dhar-Bhattacharjee, S., Edomah, N., Sule, O., Palit, D., & Yesutanbul, A. N. (2022). Brokering Gender Empowerment in Energy Access in the Global South. *Buildings and Cities*, 3(1), pp. 619–637. DOI: <https://doi.org/10.5334/bc.236>

from this study shows the performance of energy professionals is critical in facilitating women's empowerment in energy access. Key recommendations are: (1) energy professionals at the top need to recognise differentiated brokerage across the grassroots-policy spectrum to better identify and equip key actors; (2) energy brokers need to move beyond gender neutrality and economic participation acting on the breadth of women's empowerment, including psychological dimensions; and (3) women's participation across energy system transitions needs to be strengthened, with regard to energy supply chains, energy governance and as energy brokers.

1. INTRODUCTION

At grassroots level in the Global South, energy is closely linked to the built environment, including buildings that facilitate energy services. This includes building extensions to homes used by women to operate informal businesses such as selling hot drinks and food (Schiffer 2020), domestic roofs used to produce solar-powered electricity, or buildings that provide energy services in the wider community, such as mobile phone charging (Munro & Schiffer 2019). Energy sector professionals such as engineers, planners, policymakers and members of non-governmental organisations (NGOs) are crucial development actors operating at the intersection between grassroots-level energy access and overarching policy frameworks and programmes. This includes how the professionals affect the everyday use of emerging energy technologies¹ at community and household levels; questions of energy governance; and the impact of professional practices on issues of equity and justice (Lacey-Barnacle & Bird 2018). However, despite their central role, the relationship between practices of these professionals and gender empowerment in energy access has received little attention.

In response, this paper combines scholarship of intermediary actors in energy systems (Hargreaves et al. 2013; Parag & Janda 2014), development concepts of 'brokerage and translation' (Lewis & Mosse 2006; Wenger 1998) and empowerment literature (Winther et al. 2017). Through this, the practices of energy professionals working in the Global South are conceptualised as energy-access 'brokerage'. The term 'brokerage' is used here to describe the culmination of energy professionals' *understanding* of energy access, their *agency* to act on that understanding and the specific interventions or *brokering practices* they employ to affect change (Figure 1).

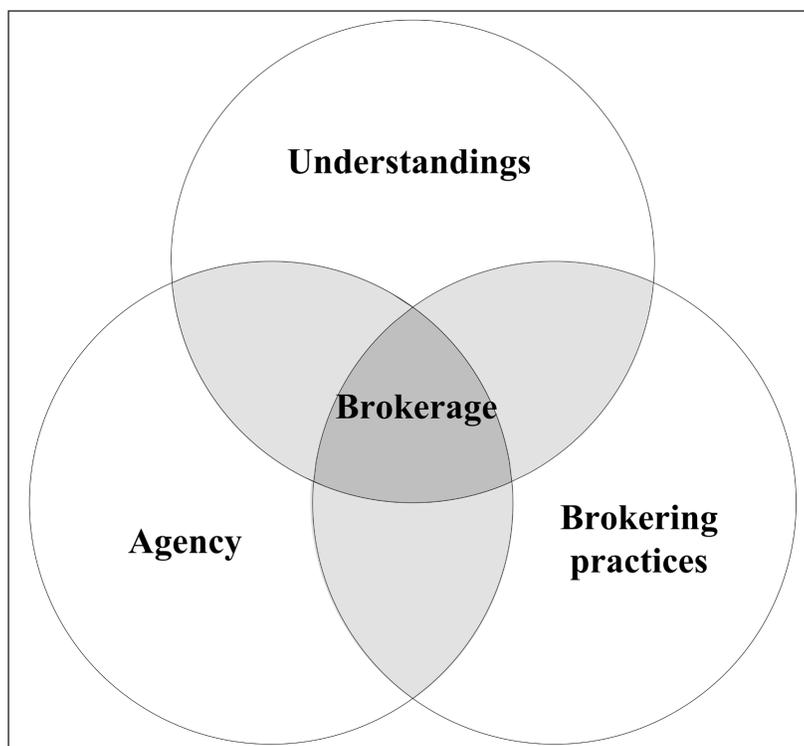


Figure 1: Conceptualising energy brokerage for improved gender equity and empowerment: understandings, agency and brokering practices in relation to emerging energy technologies and energy transitions.

Energy professionals occupy a ‘middle’ position within socio-technical change processes (Parag & Janda 2014). They are important, yet underexplored, intermediary actors that can reproduce entrenched social inequities (VeneKlasen & Miller 2002) or offer opportunities to challenge these. However, little to no work has considered the experiences, perspectives and practices of ‘energy brokers’ in the Global South in relation to facilitating equity and empowerment in energy access, especially from a gender perspective. To address this gap, attention needs to be given to ‘conditional’ factors influencing energy-access brokerage with regard to gender equity.

The present analysis is focused on off-grid contexts, including rural and remote locations, as well as informal settlements on the periphery of cities. Here first-time or increased levels of access to ‘clean’ or ‘modern’ energy (e.g. the introduction of domestic solar-powered lighting to replace kerosene lamps) are often associated with technologies that are new or *emerging* in the particular socio-cultural contexts in which they are introduced. Of particular interest here is the extent to which energy-access brokerage and the deployment of such emerging technologies reproduce entrenched gender norms and practices.

The remainder of the paper is structured as follows. Section 2 briefly discusses the literature on brokerage of gender empowerment, and what this means for energy access in the Global South. Section 3 presents methods for data collection, interview content, thematic analysis and scope. In section 4, subsequent findings are structured around three themes:

- energy brokers’ understandings of the relationship between energy access, gender equity and empowerment
- their agency in brokering gender equity and empowerment
- the brokering practices energy professionals employ to empower women—this includes the deployment of emerging energy technologies with regard to domestic and community buildings.

Key implications are discussed in section 5, followed by conclusions and recommendations for women’s empowerment in energy access in section 6.

2. BROKERING GENDER EMPOWERMENT IN ENERGY ACCESS

Decades’ worth of energy and development research has linked improved access to energy with women’s empowerment (Cecelski 2005: 35; Chant 2014; Clancy & Feenstra 2006; ENERGIA 2019; Moser 1989). The United Nations’ Sustainable Development Goals (SDGs) and their predecessors, the Millennium Development Goals (MDGs) combined gender empowerment and gender equality (MDG 3/SDG 5), assuming that equality will lead to empowerment. The focus on gender is also presented as a theme across all SDGs. Accordingly, developmental interventions have long been aimed to improve women’s lives through energy access, with emerging energy technology interventions, including solar driers (Eswara & Ramakrishnarao 2012), solar cookstoves (Abdelnour 2015; Mazzone *et al.* 2021) and solar irrigation pumps for farming (Adisa 2020), *etc.* However, studies show that energy system transitions and interventions play out in unequal ways that can reproduce entrenched structural inequities and social injustices, including those relating to gender (Bell *et al.* 2020; Johnson *et al.* 2020; Phillips & Petrova 2021). Despite the important role of intermediary actors in such transitions, little evidence shows how these are understood by energy brokers in the Global South in relation to their own professional facilitation of gender equity and empowerment.

Within the development literature, conceptualisations of empowerment have been the subject of much debate. Previously, women’s empowerment was framed primarily through an economic lens whereby empowerment was viewed as ‘economic activity’ or ‘economic advancement’, focused specifically on ‘increasing the ability of poor women to earn better incomes’ (Smillie 2000: 211; see also Gardener 1997). Over time, its meaning has broadened. Winther *et al.* (2017) define empowerment as:

a process towards gender equality, understood as women's and men's equal rights, access to and control over resources and power to influence matters that concern or affect them.

The present paper adapts this definition by using the term gender 'equity' instead of 'equality'. This subtle, but important, difference recognises the need to address existing inequities in the process of empowerment. Feminist scholars in the past have problematised gender equality as being limited to questions of uniform access only. Gender equity is a broader term that also encompasses differentiation of distribution under context-specific structures of gendered social relations, leading to greater fairness and justice (Chisamya *et al.* 2012; Khurshid 2016; Unterhalter *et al.* 2013).

At household and community levels, studies conducted over the past decades show that women bear the brunt of energy-related disempowerment (Moniruzzaman & Day 2020; Wilkins 2002). Women are recognised as facing the 'triple burden' of working for 'husband, household and community without recognition or remuneration', demonstrating the need for an equity-based approach to empowerment in energy access (Moser 1989). Similarly, Schroeder (2010: 109) highlights the triple challenges women in developing countries face, 'as indigenous women, as women and as poor women'. This is particularly pronounced in rural developing contexts where patriarchal systems persist, often resulting in distinctly gendered roles and social practices that also translate into differentiated use of buildings in relation to energy consumption practices (Govindan & Murali 2021; Greene & Schiffer 2021). For example, separate kitchen buildings may be used exclusively by women to carry out cooking responsibilities for extended family networks (Schiffer 2020).

Patriarchal challenges are further characterised by structural exclusion from decision-making processes which can prevent women from gaining access and ownership to various material endowments such as energy technologies and infrastructure (Orlando *et al.* 2018). However, to date limited research has explored how energy brokers (responsible for mediating energy system transitions) constrain or enable gender equity and women's empowerment in energy access.

'Intermediary' or 'middle' actors have been shown to play a key catalytic role in recent literature on sustainability transitions in the Global North (Kivimaa *et al.* 2019). This provides varying interpretations of intermediaries, based on their capacities (Kivimaa 2014; Parag & Janda 2014), position within the supply chain (Stewart & Hyysalo 2008) and categorisations (e.g. Hodson *et al.* 2013; van Lente *et al.* 2003). In this, intermediary actors are often identified through the role they perform (Kivimaa *et al.* 2019) as well as their capacity to enable the agency of actors operating at the top (e.g. government and policy sectors) or bottom spheres (e.g. consumers and end users) (Parag & Janda 2014). However, limited studies have explored how agency of intermediaries affects change in upward, downward or sideways directions (Parag & Janda 2014; Janda *et al.* 2019), especially in relation to equitable energy access in Global South contexts.

In contrast to work on intermediaries in the Global North, the term 'broker' has been used in development literature to describe 'intermediaries between development institutions and peasant society' or 'community and state' (Lewis & Mosse 2006: 11–13). The process of brokerage along this spectrum can be viewed as translation by energy professionals who negotiate:

common meanings [...] and the mutual enrolment and co-optation into individual and collective objectives and activities.

(Lewis & Mosse 2006: 14)

Similarly, Wenger (1998: 109) describes how:

brokers are able to make new connections across communities of practice, enable coordination, and—if they are good brokers—open new possibilities for meaning [...] whereby brokerage] involves processes of translation, coordination, and alignment between perspectives.

Subsequent brokering practices are shaped by (1) meanings and understanding of 'conditional factors', as posed by Winther *et al.* (2017) (including those relating to socio-cultural, socio-technical

and socio-political framing); and (2), agency (material, political and social constraints including brokers' social standing). However, the existing literature on brokerage has yet to explore issues of gendered inequities in energy access and its impact on women's empowerment. Furthermore, a specific gap exists in how differentiated types of energy brokers (e.g. NGOs and utility providers) 'translate' or enact gender empowerment.

3. METHODS

3.1 QUALITATIVE DATA COLLECTION

For data-collection purposes, the focus is on two regions with the lowest energy-access levels (Africa and Asia). Across these, the selection is based on: (1) countries with large populations without electricity access (India and Nigeria); and (2) countries with fast-growing access rates for clean cooking fuels (Pakistan and Ghana). A total of 86 semi-structured interviews with energy professionals were undertaken in Ghana (GH: $n = 25$), Nigeria (NG: $n = 20$), India (IN: $n = 20$) and Pakistan (PK, $n = 21$) to investigate energy-access brokerage including in relation to emerging energy technologies. The intention was to develop a practice and 'actor-oriented approach' to developmental ethnography (Lewis & Mosse 2006).

Interviews ranged in duration from 18 to 144 minutes and were carried out virtually or physically depending on availability, interviewee preference and COVID-19 restrictions.

Interview quotations used in this paper have anonymised identifiers for country, gender (man or woman) and stakeholder type (e.g. NG14, w, delivery).

Interview participants were recruited through local partner organisations using a shared sampling guide that included a spread across energy professional gender categories (women = 54.7%; men = 45.3%; non-binary = 0%). An interview protocol informed by insights from the literature was developed over successive team meetings, tested and refined further through pilot interviewing in each case context. This enabled the interview guide to maintain a general shared structure while being tailored to each specific cultural context. Following the piloting phase, energy professionals from various stakeholder categories outlined in Table 1 were recruited and interviewed.² In addition, interviews included a small number of energy professionals whom local partners identified as relevant but that fell outside the predefined categories and so are grouped as 'other'.

Table 1: Summary of interview participants.
Note: NGO = non-governmental organization.

| CASE STUDY COUNTRIES | | GHANA (GH) | NIGERIA (NG) | INDIA (IN) | PAKISTAN (PK) | OVERALL |
|--|---|------------|--------------|------------|---------------|-------------------|
| Participant count (% across all countries) | | 25 (29.1%) | 20 (23.3%) | 20 (23.3%) | 21 (24.4%) | 86 (100%) |
| Participants per gender (% across country) | Men (m) | 14 (56.0%) | 10 (50.0%) | 7 (35.0%) | 8 (38.1%) | 39 (45.3%) |
| | Women (w) | 11 (44.0%) | 10 (50.0%) | 13 (65.0%) | 13 (61.9%) | 47 (54.7%) |
| Participants per stakeholder type (% across country) | Policy (all stakeholders connected to policy development and implementation, including elected politicians, policy officers, policymakers, etc.) | 2 (8.0%) | 2 (10.0%) | 4 (20.0%) | 4 (19.1%) | 12 (14.0%) |
| | Electric (stakeholders from institutions/companies concerned with the generation, distribution and supply of electricity, e.g. energy utilities, distribution network operators, energy coops) | 5 (20.0%) | 2 (10.0%) | 2 (10.0%) | 3 (14.3%) | 12 (14.0%) |
| | NGO (including all civil society and NGOs working on energy provision) | 9 (36.0%) | 5 (25.0%) | 4 (20.0%) | 6 (28.6%) | 24 (27.9%) |
| | Planners (development authorities/planners/architects (i.e. those responsible for putting the visions into plans)) | 2 (8.0%) | 4 (20.0%) | 4 (20.0%) | 3 (14.3%) | 13 (15.1%) |
| | Delivery (engineers and others responsible for putting those vision-led plans into action, i.e. delivering services and solutions) | 3 (12.0%) | 6 (30.0%) | 3 (15.0%) | 5 (23.8%) | 17 (19.8%) |
| | Other | 4 (16.0%) | 1 (5.0%) | 3 (15.0%) | 0 (0.0%) | 8 (9.3%) |

Interview questions were grouped into five parts

- Part 1 provided introductory questions focused on the interviewee's organisational role, work priorities and professional background.
- Part 2 explored professional understandings of equitable energy access and gender, including intersectional dimensions and energy-related consumption and decision-making at household and community levels. This was a key part of the interview in which questions were carefully layered to unpack meanings associated with energy professional practices.
- Part 3 built on part 2 and explored policies and professional interventions in relation to gender equity in energy access, including speculative discussions of best practice for achieving gender equity.
- Part 4 provided additional optional questions relevant depending on the type of stakeholder interviewed and their location.
- Part 5 was a short closing section to finalise the interview.

Following transcription and in some cases translation of interviews, NVivo software was used to carry out an initial thematic data analysis for the project. The interview questions provided an initial starting point for the development of themes, which were iterated through several layers of coding during the project. To reflect the refined scope of this paper on energy professionals brokering empowerment in energy access, a secondary NVivo analysis using keyword searches was carried out. This emphasised off-grid contexts in which technologies introduced to provide first time or increased levels of energy access can be framed as *emerging*. Analysis in this later stage was guided by Winther *et al.*'s (2017) energy empowerment framework, drawing out the dimensions of 'overarching issues' and 'conditional factors', agency of energy brokers, including the various resources (material and otherwise) used in equitable access to energy, as well as brokering practices for emerging energy technologies and energy transitions.

4. FINDINGS

Findings are presented in three overarching themes that emerged from the analysis, discussed below.

4.1 ENERGY BROKERS' UNDERSTANDING OF GENDER, EQUITY AND EMPOWERMENT

This subsection explores energy brokers' understandings of gender equity in relation to energy access, covering 'overarching issues' and 'conditional factors' (Winther *et al.* 2017). These include recognising social norms of gender as integral to women's everyday energy practices, the subsequent challenges for gender equity and understanding access to energy as a basic human right:

Personally, I think access to energy is a basic human right, just as free speech and access to water and for me, energy access should be at that same level [...] for countries to be able to deliver that right to their citizens. It's a problem of equitable access for me [...] everyone should be able to walk into their homes to live a life that is fully powered.

(NG14, w, delivery)

Others highlighted how access to energy was unevenly distributed between rural or remote and urban areas, resulting in greater spatial inequities. For example, while Ghana has 85% electricity access in urban centres, those living in rural areas, including remote island communities, continue to be disadvantaged. This motivated the following participant to direct their professional practices to these peripheral areas:

Ghana has done well in terms of energy access in the West African sub-region. It's one of the countries with the highest access level. Currently at 85%. [...] Urban centres have

access to electricity. It means the [remaining] 15% are people who are in rural areas. And out of the people who are in rural areas [and without electricity access,] most of them are in the island and lakeside communities. That's why I chose to do my project [...] in those [rural] areas. Though they may not form a majority of the population, they also have the right to access, according to our constitution.

(GH19, w, public sector/doctoral student)

This extract suggests that meanings of energy access that professionals hold can direct their brokerage of more equitable access. The interlinkage between meanings and professional practices was a theme to emerge more broadly across the sample. Regarding the meaning of energy access as a basic right, political frameworks, including constitutions and regulations, acted as conditional factors.

Women's differential access to energy was also shaped by underlying socio-cultural norms, especially in the context of gendered division of domestic energy practices, including those relating to purchasing domestic technologies:

Whether we like it or not, we have gender roles. [According to society] it's the duty of a woman to cook. And the man determines the kind of appliances that are brought home. If a woman had the power, she would buy a blender, a freezer and all those things, but when it comes to a man, the first thing that he would like to buy is the entertainment stuff, a TV, a radio.

(GH19, m, policy/other)

Daily energy routines including collecting fuel and cooking were recognised as gendered, impacting on women's health and time, particularly in rural areas, as highlighted by the following policy professional:

In villages, solid fuels, wood is collected, and this is the responsibility of women in rural areas. They spend more time compared to men in finding these resources and utilising them [...] women have more health hazards due to cooking issues, pollution hazards due to using other resources and males are not at the same risk. So, within households this balance in terms of need for electricity is more towards women.

(PK18, m, policy)

Professional understanding of gendered energy consumption in everyday domestic contexts was also related to changes in broader considerations of what equitable energy access means and how it is integral to empowerment:

About five, six years ago, [...] we were defining access as access to lighting, access to cooking energy, etc. But now we have a slightly expanded definition of energy access that we would say, energy for livelihoods, energy for education, energy for agriculture, energy for women's empowerment.

(IN7, w, professional working in the energy sector)

However, it is important to note that not everyone interviewed agreed on a link between gender equity and energy access. In fact, several participants in Nigeria, India and especially Pakistan stressed gender neutrality, that is, avoiding the need to specifically distinguish energy-access policies and practices for different genders, including to benefit women:

And I feel that gender equity is imperative but not in the energy sector.

(IN18, m, NGO/planner)

As far as renewable energy is concerned, we try to keep it gender-neutral. [...] In the power sector, all the old policies are mostly gender-neutral because the main target is to provide electricity access, affordable energy and sustainable energy solutions. So, where we talk about sustainable energy, we try that all men and women get energy access.

(PK18, m, policy)

Nonetheless, those who did recognise gender as an integral part of equitable energy access were also able to provide a more nuanced insight into such conditional factors that constrained women's access to energy. Patriarchal norms that inculcate women's roles through the gendered division of labour were discussed as delimiting their access to and control of energy resources, particularly concerning energy-related purchasing investments, as highlighted in the following interview:

Most energy solutions are expensive therefore men do that [...] women [...] would not make those decisions traditionally unless it was something small, so if it's a small affordable lamp, perhaps women would be brought in the conversation or if they can link it to their work, they can definitely be a part of the conversation. But when it comes to larger investments for example [...] solar panels in the house or buying a generator, these are definitely male decisions.

(PK9, w, NGO)

As these extracts suggest, for many energy professionals, access to emerging technologies and the consumption practices in which these are embedded are highly gendered and shaped by wider socio-cultural norms. This includes gendered decision-making regarding the integration of more financially and infrastructurally significant technologies into domestic buildings.

Gendered differences are further highlighted in the context of women's entrepreneurship, which is often focused on small-scale and informal sector activities:

Ghana [...] is still a patriarchal society, so they're [women] the ones involved in cooking most of the time. And then because they are very much involved in the informal sector, especially cooking and selling and all kinds of things, they need energy to drive all these besides their cooking.

(GH8, m, NGO)

Analysis showed that women's economic activities were mostly targeted towards 'material resources' in Winther *et al.*'s (2017) empowerment framework, but failed to address 'material endowment', that is, long-term control over finances and assets, including in relation to more significant investments and alterations to buildings. Most energy brokers' understanding of economic empowerment supported conventional energy and development policy framings of women as 'untapped entrepreneurial resources' (Phillips & Petrova 2021). In turn, this compounds multiple burdens for women (Chant 2014) through the intensification of women's unpaid reproductive work with added productivity through economic contributions to the household (see also Moser 1989; Schroeder 2010).

4.2 AGENCY TO BROKER GENDER EQUITY IN ENERGY ACCESS

Energy brokers are situated between everyday energy use at the community and domestic levels and overarching policy frameworks and programmes. As such, their agency to broker and translate access to energy is dynamically located along the grassroots-policy spectrum. The following explores this dynamic agency to broker gender equity and empowerment in energy access.

Analysis showed that energy professionals' agency to broker gender equity in energy access was directly linked to women's equitable participation within the energy sector. Several participants, especially in the non-governmental sector, highlighted how women can benefit from taking a greater role in the wider supply chain of emerging technologies rather than just as end-users. This included the design and manufacturing of emerging technologies such as clean cookstoves:

You'll find women in marketing, but when it comes to [...] production, usually that's left to men. If we want to make sure that women also have equitable access [...] then you should get them in the earlier stages of production, get more women trained in production.

(GH4, m, NGO)

Discussions around the need for women's participation in energy supply chain activities were most prominent among both NGO workers and delivery professionals. For example, when asked what could be done to improve women's participation, the following technical professional in India responded:

Educating them. Educating them, forming committees, establishing mandatory interfaces between the lowest rung of the bureaucracy, the supply chain and the women, so the whole consumer groups.

(IN5, w, delivery)

In addition, the lack of women's participation in energy-related decision-making or governance processes was understood by many non-governmental sector workers as a symptom of gender inequity, further constraining women's empowerment:

Normally, [...] there's a national stakeholders' conference on clean energy or clean cooking stoves, but the women in the village are not part of the meeting. [...] Making choices on behalf of women, I think, does not demonstrate gender equity or gender mainstreaming. The women themselves, must be the front.

(GH6, m, NGO)

Gendered gaps in decision-making processes relating to energy are deeply entrenched and continue to persist. While this was especially pronounced in countries such as Pakistan and Nigeria where mostly gender-neutral policies and practices prevail, such gaps were also evidenced in Ghana despite a national policy landscape that recognises the importance of gender mainstreaming, which is discussed further below:

All energy interventions talk about mainstreaming gender, so that is a recognition that there is a missing link or gap there.

(GH21, m, NGO)

Women's lack of participation in energy governance was also discussed as shaping the experience and agency of women energy brokers in challenging existing power dynamics, especially when in minority positions. It was revealed that wider socio-cultural factors influence how energy professionals engaged with local communities in their work and in what was considered appropriate behaviour by both men and women brokers that reflected wider gender norms. For example, the following Pakistani social enterprise worker's experience highlighted the ways in which gendered norms shape how brokering is practiced as well as how it creates particular experiences of vulnerability and constraint among women professionals and citizens:

If a male team member is accompanying me to the community, he cannot interact with the women, only I can interact with them. However, the men from the community can [interact with me ...] then you get this feeling, because the men are in larger number, and they know how to read and write a little bit, they behave as if they can respond to our questions more authentically and that women are completely useless. And they keep surrounding you, so your comfort level is compromised.

(PK21, w, delivery)

Extracts and experiences such as this indicate that the empowerment of female end-users at household and community levels is, *inter alia*, shaped by professional women's agency (or lack thereof) to broker equitable participation which is also constrained by existing gender norms. Such gendered structural inequities highlight entrenched procedural justice challenges (equitable participation) for women in energy access. This is also true for energy governance at the national level, where women's underrepresentation can have consequences for their equitable access to energy as well as the agency of women professionals to broker it. The issue of underrepresentation of women was illustrated by a Pakistani participant from a construction and development firm who narrated her experience of attending a high-profile government roundtable on women-led businesses:

So, the hall, which comprised more than 100 people and I was the only female and the other female was from UN [United Nations] women. But she was there in an observer capacity, so for me it was very surprising that you do not have the stakeholder for whom you are having this discussion [present], you haven't invited them [women] to participate [... so] I raised the point that we are talking about women entrepreneurs and female-led business, but they are not even present in the audience, so how can you talk about it?

(PK16, w, planner)

This demonstrates how male-dominated energy-access brokerage can unintentionally disempower women. Their absence can result in gender oversights leading to 'gender-blindness' (Govindan *et al.* 2020).

While women's ratio of political and economic participation may vary in different contexts, these examples speak to the kinds of everyday power dynamics women may experience as energy professionals and their impact on their agency to broker gender equity in energy access. They also highlight the need to explore overarching frameworks, including energy-related policies, that enable women's participation and shape their brokering agency.

The term 'gender mainstreaming' is commonly used to describe frameworks and programmes that seek to integrate gender equity in energy policy. The interviews showed that for countries where national policies include gender mainstreaming, a more nuanced discourse emerged, highlighting to what extent this tool was enabling empowerment as well as what other measures were needed to support the work of energy brokers at the national level. This discussion included energy professionals, again primarily non-governmental sector workers, stressing the need for gender-disaggregated household data and the challenges around policy implementation at local level:

Another thing is the lack of gender disaggregated data [...] it makes planning for gender mainstreaming very difficult.

(NG6, w, NGO)

When we look at our renewable energy masterplan, it has gender mainstreamed in the plan. So, at the national level we have made headway in mainstreaming gender in our key development plans when it comes to energy and climate change. With the implementation, that cannot be done only by the state bodies that are mandated to do so. I think that civil society organisations and women groups as well have a key role in ensuring that gender is key when it comes to implementation of these development plans and programmes.

(GH7, m, NGO)

Here the central role played by international actors such as donors and investors was recognised in ensuring gender mainstreaming was considered in the first instance, enabling energy brokers to more explicitly focus on gender equity in their roles. The following development professional reflected on how this had created new opportunities for women:

Increasingly, as the sector is also mainstreaming these aspects of gender and social inclusion, my roles and my designation is also becoming more pronounced [...] if I wanted to do gender, say, five or seven years ago, I would be doing it through a different role. [...] Whereas today, donors, and investors are looking to invest in roles and skills that bring in that kind of value. And therefore, your designations also become more explicit.

(IN16, w, planner)

The example further illustrates how 'energy brokers' operate between 'formal objectives and goals and those that emerge through [...] practices' (Lewis & Mosse 2006: 9). In countries such as

Pakistan where gender mainstreaming is notably absent from national policies, this gap can also limit energy brokers' agentive power. However, evidence suggests that gender mainstreaming processes need to be carefully monitored to avoid tokenistic approaches to 'tackling' women's underrepresentation in energy governance:

So, in a number of ministries, in various countries, there are these gender focal points. But these are very toothless [...] very low decision-making power via young women given an additional responsibility, which nobody takes seriously. And mostly it is thought that if you have a gender focal point, you know, you've done it, your gender work is done.

(IN11, w, other)

4.3 BROKERING WOMEN'S EMPOWERMENT IN PRACTICE

This section examines some of the practices or interventions used by energy professionals to broker gender equity in energy access. Notably, the analysis showed that energy professionals working mostly in the non-governmental and energy delivery sectors emerged as the actors most explicitly focused on brokering gender equity in energy access through their professional practices. Some of the key brokering practices or interventions are discussed below and include the provision of technologies specifically targeted at women, such as solar lanterns or clean and efficient cookstoves in off-grid contexts.

According to the head of a clean technology services company in Pakistan:

some of the things that we do [...] are relevant to people in peri-urban and rural areas where there is lack of energy access and not just power [...] we keep displaying and keep encouraging other technologies like those heat stoves which are very important when it comes to the lack of energy access because it impacts negatively [...] especially the women over there.

(PK14, m, delivery)

Similarly, a participant in Ghana working on delivering renewable energy at the community level emphasised the need to target women:

I always look for the women and the youth. Because the youth, let's say, the person is a school child, they need that light to learn, [...] with. Why should I give that lantern to the father who would only listen to music and then use it to walk on his path to his friends to play cards. Why would I do that? Why would I give it to the man when he doesn't have any kids to take care of, but the woman have to make the bed, have to wash, have to do this, and she needs the light instead of using the candle and or [...] the kerosene to do all that.

(GH5, w, delivery/NGO)

Analysis of the interviews showed that most energy-technology interventions targeted at women were either intended to reduce drudgery associated with women's domestic practices or to enhance their opportunities for economic participation. The former often focused on integrating new labour-saving devices into practices such as cooking, collecting water and other household chores, e.g. through the provision of clean energy cookstoves or solar-water pumps. Technology interventions focused on enabling economic participation through provisioning solar lighting in the evenings or 'motorised' means of working. In this, training and educating rural women on the relative time they may save by adopting modern energy technologies was highlighted as a key benefit, as illustrated by one NGO participant in India:

most of the women wanted to spend the increased time with their children's homework or devoting more time to their children [...] we had to tell these rural women why, how switching over to an energy-based enterprise can save time. [...] They were doing manual pottery [...] motorise that [...] the speed increases. [...] We realize that starting with training, that's why saving of time is important, [...] because you're working

continuously. So, if you use energy, you save two hours, your productivity increases, you save time, and this extra time, you can use to produce more, in case you want more money.

(IN15, w, NGO)

As seen in this example, the freeing of time in such narratives of energy access was often equated with women's increased uptake of emerging technologies for greater production, leading to their enhanced economic empowerment. In turn, this was correlated with women's increased skills and capacity, as well as improved participation in the energy supply chain:

we try as much as possible to align our work with the SDG's, [...] we always recommend [...] women to partner with us. We have over 200 installers working with our different investment companies and we always advise them to go for women installers to have a balance of men and women 50/50. I have observed that in this society women are not coming out sometimes. [...] I don't know why but few of them applied and those that apply, we work with them.

(NG5, m, NGO)

Energy professionals in the NGO sector broker the trajectory of energy access and adaptation of new and emerging energy technologies. They do so through 'translation' into common meanings, e.g. the saving of time or shifting social norms in which women increasingly take up technical delivery roles (Lewis & Mosse 2006: 14; Hilhorst 2003). However, with the emphasis on productivity and economic participation, far less attention was given to how emerging technologies can improve women's social/psychological empowerment (Clancy 2016), e.g. by enabling leisure activities.

All energy brokers, irrespective of their stakeholder types, acknowledged the need for women's equitable participation across various stages of the energy supply chain (as shown in section 4.2). In this regard, most energy brokers, including government actors and electric utilities staff, only went so far as implementing organisational gender quotas, which often remain unfulfilled due to structural gender inequities. In contrast, members of NGOs and staff working at grassroots-level delivery were seen to mediate women's improved participation in decision-making from the bottom-up with a more integrated and arguably empowering approach:

Women must be on the frontline when it comes to gender in energy. [...] We encouraged women in the community [... so] when concerns of energy issues come up, they can also have a say. I realised, there was a particular woman who had in-depth knowledge about energy access and could have fronted a lot of things for the community in terms of understanding and trying to put the requests to the front, but because she was a woman her voice was not clearly heard [...] when the meetings are called, they call only the chiefs without the queen mothers. [...] To have her talk to us, it was a big deal for her. We gave her the audience to speak to the chief on the ideas she [...] had.

(GH3, w, NGO)

We used to select a Roshna Bibi [Light Woman—a woman selected to be a rural solar entrepreneur] in the village, in whose home we would install the solar plant. [...] These are women from the community, who people think are reliable. [...] They know basic bookkeeping and people trust them [...] the idea was to create awareness that women can also start this business and contribute their daily wage at home.

(PK21, w, delivery)

Through such brokering practices, these energy professionals were also better able to identify the missing links in policies and practices for equitable access, e.g. by carrying out and translating research into decision-making spheres.

Access to clean cooking, it's a matter of life and death for families, especially women [...], and this is an area that is very under-researched, does not figure much on the policy

radar and has very low priority. So, one research that we're doing [...] is to [...] look at the political economy for clean cooking and understand why it attracts so low priorities and [...] what we can do [...] to raise the profile of clean cooking so it can attract powerful and influential actors to be able to focus on them and address the issues.

(NG1, m, NGO)

The above demonstrates the central role of NGO and delivery actors in brokerage and translation between the grassroots level and policy spheres to empower women in energy access through provision of technology, capacity-building as well as brokering participation and translating information at different levels of energy governance.

5. DISCUSSION: DIFFERENTIATED BROKERAGE FOR ENERGY ACCESS AND EMPOWERMENT

The findings presented above explore gender equity and empowerment in energy access through the conceptualisation of brokerage: energy professionals' understandings, agency and brokering practices. Specifically, the contribution of this analysis is discussed with regard to energy brokers facilitating energy system transitions in relation to achieving gender equity and empowerment in the Global South. This helps to unpack 'differentiated brokerage' in terms of varying understandings, agency and practices across types of energy professionals and national contexts. Figure 2 presents a conceptual map that illustrates key dimensions of differentiated brokerage that emerged during the analysis.

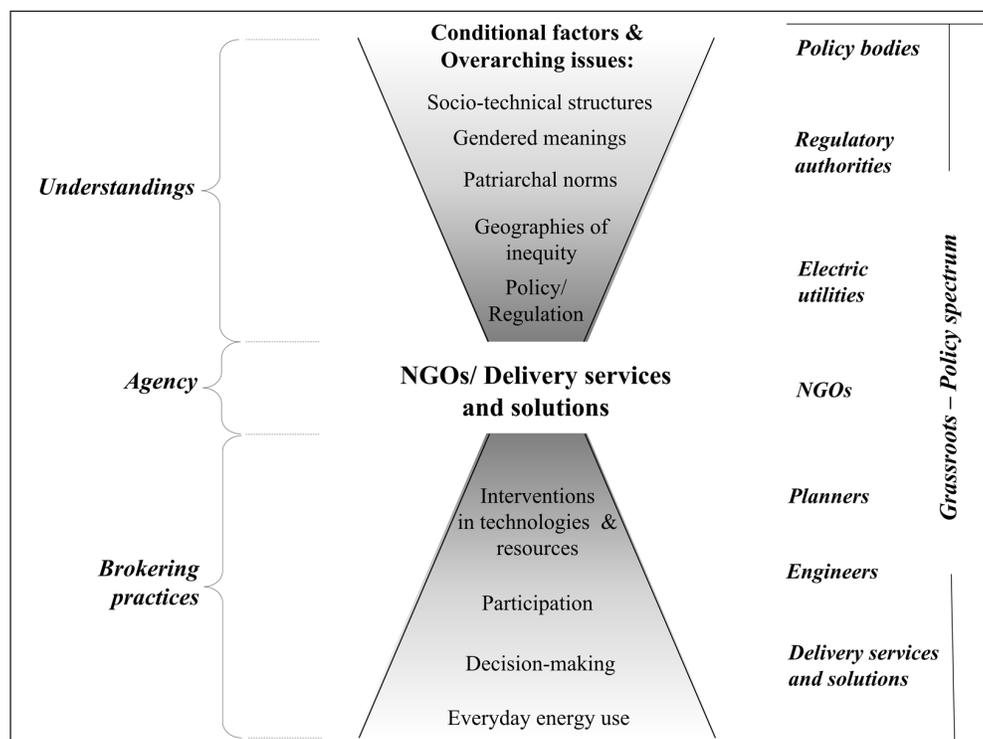


Figure 2: Brokerage of gender equity and women's empowerment in energy access through non-governmental organisations (NGOs) and/or delivery-based energy brokers.

In terms of understandings, this showed that access to energy was regarded as a human right and inequitable access was often highlighted in relation to distributional differences. This includes geographies of inequity (e.g. urban-rural divides), as well as gendered energy use in domestic energy-consuming practices. Both have implications for the built environment, including buildings associated with gendered energy usage or decision-making at the grassroots level.

However, the analysis of understandings also highlighted that energy access often remained disconnected from gender equity and empowerment in professional practices and policies. Prevalent understandings of energy access as being gender neutral were especially highlighted amongst stakeholders from policy bodies and electric utilities.

There were also stark differences at the national level, e.g. between Ghana, where gender mainstreaming had been introduced as a policy tool, and Pakistan, where gender was notably absent from energy policy. However, energy brokers working in the NGOs and delivery services stood out as recognising gendered distributional differences as integral to equitable energy and were able to provide more nuanced insight into structural or ‘conditional factors’ (Winther *et al.* 2017), including patriarchal norms. From this, two broad groups of brokers begin to emerge: those directly connected to the grassroots; and those that have brokering powers but operate at the top and from a distance (policymakers, electric utilities, planners).

Even for NGO and delivery sector professionals, women’s empowerment in energy access was mostly seen in relation to increased economic participation, in line with a traditional development paradigm (*cf.* Gardener 1997: 139; Smillie 2000: 211). Women’s social and physiological empowerment beyond this was largely overlooked (Clancy 2016).

Energy brokers’ agency to empower women in energy access was shaped by their positionality, their interactions with grassroots actors, and the wider social and political contexts framing their work. Gender-responsive policy stressing gender mainstreaming emerged as an important tool for introducing considerations of gender among energy professionals, as well as to strengthen their agency to broker equity. However, even with gender-responsive policies in place, these may not translate directly into gender equity and empowerment in practice, as was the case of Ghana, where gaps in the implementation of policy act as a key constraint.

The gap between policy and brokering practices is further exacerbated when energy-access interventions are not specifically linked with gender equity and women’s empowerment, e.g. by reproducing existing gendered roles and relations or by further increasing women’s workload. The same can be true for policies that lead to tokenistic gestures which reinforce entrenched structural inequities. This, together with other associated pragmatic constraints, such as the lack of gender disaggregated data (e.g. Khalid & Foulds 2021), can hinder equitable energy access.

However, the analysis also demonstrated differential brokerage whereby energy sector professionals from NGOs or delivery services can be ideally positioned as energy-access brokers within the grassroots–policy spectrum. They are able to broker improved gender equity and women’s empowerment in energy access, e.g. by enabling women to take on technical roles (e.g. as installers of emerging technology) or encouraging their participation in energy-related decision-making (e.g. in male-dominated community forums). As such, they are brokering women’s empowerment in energy access as a ‘community of practice’ that was especially highlighted in the analysis (Wenger 1998).

Gender-differentiated agency of brokers was mediated by wider patriarchal gendered norms concerning appropriate and acceptable conduct. Women energy brokers who found themselves in minority positions, on either side of the grassroots–policy spectrum, experienced male-dominated energy-access brokerage as a constraint to women’s empowerment. Hence, the lack of women’s representation across different parts of the energy system was highlighted as both a consequence of structural inequities as well as a constraint to women’s empowerment therein. This differentiated agency based on energy broker’s gender and positionality make a specific contribution to the understanding of ‘intermediary’ or ‘middle actors’ in the Global South context. It demonstrates that empowerment of women as end-users is linked with women’s agency in their role as energy brokers.

The analysis explored specific brokering practices carried out by energy professionals to empower women in energy access. Again, those working in the NGO and delivery services appeared particularly well placed, not only in relation to understanding the needs of women in off-grid rural communities but also to addressing these needs through contextualised interventions, e.g. targeted technologies, as well as skills and capacity-building and improving women’s participation in decision-making. Their brokering practices also highlight how emerging technology provision can act as a steppingstone to tackle some of the wider gendered inequities in societies. In this context, the built environment can act as a vehicle, e.g. to include women in local decision-making about new energy infrastructure on buildings.

Analysis also revealed that NGO and energy delivery workers in particular focus on brokerage in a way that connects their brokering practices and interventions to political asks (such as inclusion of gender in policy). This demonstrates their dynamic role along the grassroots–policy spectrum

in which they broker and translate meanings of empowerment (Hilhorst 2003). Further research is required to analyse the impact of this.

Table 2 provides key considerations for energy professionals to reflect on their approach to gender equity and women’s empowerment that have emerged from the research.

| ENERGY ACCESS BROKERAGE | CONSIDERATIONS FOR NGO/DELIVERY ACTORS | QUESTION FOR ELECTRIC UTILITIES, POLICYMAKERS, PLANNERS |
|---|--|--|
| <p>Understandings Meanings and understanding of ‘conditional factors’ including socio-economic, socio-cultural, socio-technical and socio-political dimensions</p> | <ul style="list-style-type: none"> • What are the specific underlying socio-cultural structures that exacerbate energy-access inequalities for women in the context where we operate? • Who makes decisions about emerging technologies and infrastructure at household and community levels (including energy finance)? • How do geographies of inequity play out at the grassroots level, e.g. in relation to the gendered use of buildings and application of emerging energy technologies? | <ul style="list-style-type: none"> • What are the socio-cultural norms that shape different women’s energy access and consumption at home, in the community or the city? • What is the role of women in energy systems change including policy, supply chains and decision-making at different scales? • What geographies of gender inequity exist? How are these experienced by different women in society (e.g. rural, urban periphery)? |
| <p>Agency Political, financial, material as well as social constraints</p> | <ul style="list-style-type: none"> • How does the positionality of energy professionals in my organisation affect engagement at grassroots level and in their interactions with national energy forums? What organisational support can be offered to ‘lone’ women professionals operating in these contexts? • What political, financial and material resources are available to support gender equity in energy access at the grassroots level? • What opportunities are there to translate grassroots experiences into national policy frameworks? | <ul style="list-style-type: none"> • How do we foster greater understanding and representation of gender in national energy forums? How do we ensure decisions are made by and with, instead of about, women? • Do policy frameworks explicitly and sufficiently support gender equity in energy access? What finance and other resources are available to support this? • Are we collecting and making gender-disaggregated data available to help improve gender equity in energy access? |
| <p>Professional practices Energy-access brokers’ interventions</p> | <ul style="list-style-type: none"> • Are we promoting women in decision-making processes that affect the energy technologies they use? • Are we promoting women in wider energy systems roles or just viewing them as consumers? • Are our emerging technology interventions helping to shift entrenched gender norms and roles and/or address women’s needs beyond economic participation? | <ul style="list-style-type: none"> • Are we ensuring women’s participation in energy systems change is meaningful or simply offer tokenistic inclusion? • Do we have effective mechanisms in place to ensure gender-sensitive policy translates into improved gender equity in energy access at grassroots level? |

Table 2: Energy professional considerations for improving equity in energy access for women.

6. CONCLUSIONS

This paper explores brokerage of gender equity and women’s empowerment in energy access through the lens of energy brokers in Ghana, India, Nigeria and Pakistan. It addresses a significant gap in the literature on such actors, which operate along the grassroots–policy spectrum of energy system transitions in the Global South. In particular, the paper contributes theoretically to the literature on energy and development by uniquely integrating scholarship on intermediary actors in energy systems, brokerage and translation, and empowerment. It contributes methodologically through its exploration of how energy interventions, including the provision of emerging energy technologies and their integration into grassroots buildings and settings, are shaped by energy brokers’ understandings and agency.

From the thematic analysis, the following key recommendations emerged in support of brokerage towards women’s empowerment in energy access:

- *Recognising differentiated brokerage across the grassroots–policy spectrum*
Energy professionals, especially those at the top, need to recognise differentiated brokerage across the grassroots–policy spectrum and how this intersects with relative agencies, understandings and brokering practices to empower women in energy access. This can help better identify and equip key actors for specific policy interventions. For example, energy brokers working in the non-governmental sector and delivery services who work directly with

off-grid, rural and remote communities are often best placed to broker gender-equitable energy access. They can provide contextualised socio-technical interventions and translate these to influence wider policy frameworks and programmes.

- *Moving beyond gender neutrality and economic participation*

Energy brokers must recognise that energy access is often highly gendered at domestic and community levels and that framing it as ‘gender neutral’ is unhelpful in the context of women’s empowerment in energy systems change. Second, while economic participation through energy access is important, energy-access interventions that seek to empower women should also look to address the underlying social norms through social sector policies. Here integration of emerging technologies, such as solar installations on household or community buildings, also provide an opportunity to have broader conversations, e.g. regarding the role of women in decision-making processes.

- *Empower women’s participation across the energy system transitions*

Alongside the continuation of targeted interventions to improve energy access for women, brokering practices need to empower women for participation across the energy system, including in energy supply chains (design, planning and implementation of emerging technologies), energy governance at various levels of decision-making, and thereby in the role of energy brokers. This is especially important in contexts where women are in minority positions (e.g. policy bodies and electric utilities). Creating networks to support these actors will strengthen women’s roles in energy brokerage by helping them to share and learn from best practice as well as to offer a safe space for exploring specific challenges these women encounter.

The research demonstrates the value of an energy brokerage perspective in considering the dynamic and differentiated role that certain energy professionals play towards equitable energy access and women’s empowerment. Their engagement with the built environment through energy-access interventions and emerging energy technologies is therefore part of a wider socio-technical system. Here their performance as energy brokers is critical in facilitating women’s empowerment in energy access and has implications for wider questions of energy justice (e.g. Walker & Day 2012; Lacey-Barnacle et al. 2020) that require further study.

The present research highlights the need for additional exploration, especially of intermediary actors able to translate along both ends of the grassroots–policy spectrum and regarding the contexts of specific countries. While the interviews focused on insights of individual energy professionals, it emerged that in several countries interviewees collaborated on multiple programmes and activities. This suggests shared understandings, agency and brokering practices, warranting further research.

NOTES

- 1 In development studies such emerging technologies were previously framed as ‘appropriate’ or ‘intermediate’ technologies (Schumacher 1993; Smillie 2000). Their emphasis on decentralised and local manufacture demonstrates shared values with calls for distributed renewable and just energy transitions, especially in the context of underserved rural settlements.
- 2 All interview quotations in the findings section are provided in reference to the stakeholder abbreviations noted in Table 1.

ACKNOWLEDGEMENTS

The research findings derive from a collaborative research project titled ‘Gender Equity and Energy Access in the Global South’ led by Anglia Ruskin University UK (<https://www.energyaccessandgender.co.uk/>).

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Paper development was led by Anne Schiffer, Mary Greene and Rihab Khalid. However, it was a larger collaborative effort with significant contributions from all listed authors regarding research design, data collection, analysis, written contributions and/or feedback.

COMPETING INTERESTS

The authors have no competing interests to declare.

DATA AVAILABILITY

Anonymised data gathered as part of the ‘Gender Equity and Energy Access in the Global South’ project can be accessed at: <https://doi.org/10.25411/aru.c.5505273.v1/>. Suggested citation: Gender Equity and Energy Access in the Global South (2021). Anglia Ruskin University Collection.

ETHICAL CONSENT

Ethical approval for the project (Anglia Ruskin University (ARU) Global Sustainability Institute’s Research Ethics Panel, GSISREP-2021-002) was obtained as part of the research planning and before data collection, following standard considerations for participants’ informed consent, anonymity and secure data storage.

FUNDING

This project was funded by Anglia Ruskin University’s QR-GCRF 2020-2021 allocation.

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TO CITE THIS ARTICLE:

Schiffer, A., Greene, M., Khalid, R., Foulds, C., Vidal, C. A., Chatterjee, M., Dhar-Bhattacharjee, S., Edomah, N., Sule, O., Palit, D., & Yesutanbul, A. N. (2022). Brokering Gender Empowerment in Energy Access in the Global South. *Buildings and Cities*, 3(1), pp. 619–637. DOI: <https://doi.org/10.5334/bc.236>

Submitted: 31 March 2022

Accepted: 29 July 2022

Published: 19 August 2022

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