Local Frictions in the Energy Transition

Design Anthropology for the Emergence of Energy Communities

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Working in an interdisciplinary consortium aiming to design an innovative smart energy system in Amsterdam, we report on frictions encountered in ethnographic fieldwork. These frictions pertain to the invisibility of energy infrastructure and the resulting lack of a relatable narrative, people's past experiences with public participation in the energy transition, and conflicting time horizons of long-term policy goals with people's short-term concerns. We reflect on the starting assumptions of the project in which this study is embedded, noting how the typical techno-economic framing of renewable energy projects inhibited the building of social connections and rapport within our fieldwork. Using a design anthropology approach, we describe how ethnographers can support the emergence of local energy communities and identify future directions to address the frictions identified. These directions include making energy systems more socially experienceable, design anthropologists mediating between people and institutions, and embedding ethnographic engagements in institutional structures to ensure continuity.

INTRODUCTION

By reporting on ongoing ethnographic fieldwork that we consider challenging and of limited success, this paper describes three frictions associated with the transition from fossil to renewable energy sources in The Netherlands, i.e., the Dutch energy transition. The authors collaborate in an ongoing energy innovation project in Amsterdam South-East, where the goal is to develop a "smart energy platform" that inclusively benefits the local community. Working in an interdisciplinary consortium with various partners, including electrical engineers, municipal representatives and the operator of the local electricity grid, our initial role was to design the user-facing part of the system using a human-centered design approach. In the paper, we describe the difficulties encountered during fieldwork in a diverse neighborhood with numerous socio-economic challenges, prevalent distrust towards institutions, and an 'overstudied' local population, leading us to question this initial assumption. From our experiences in the field, we generalize and identify three frictions for ethnographers working in energy transition projects.

The municipality of Amsterdam has set an ambitious target for a 55% CO_2 emissions reduction in 2030 (Municipality of Amsterdam 2020). This ambition is not without challenges, as energy poverty (defined as the lack of affordable and reliable access to energy supply and services) figures are rising (Municipality of Amsterdam 2022), and congestion in the electrical grid is threatening the reliable delivery of

power in the future. The authors' project has a dual purpose of addressing these challenges: firstly, to develop a smart, digital platform to incentivize local energy users to change their behavior to reduce congestion, and secondly, to ensure that the energy platform benefits residents in a local neighborhood in an inclusive manner, prioritizing the needs of marginalized and oft-overlooked social groups.

From the beginning, the authors brought a design anthropology approach to this project, intending to build trust and learn about local residents' needs to inform the design of the smart energy platform. As will become evident, the fieldwork revealed flawed assumptions within the project's approach, which reflect more significant and systemic frictions for the energy transition. We position these findings in a growing body of literature that explores the relevance of ethnography for energy studies and identifies future directions for ethnographers to address the frictions identified.

The first friction pertains to the lack of a relatable narrative around the social relevance of energy systems, resulting from the invisibility of energy infrastructure. Previous studies have explored aspects like the multisensory experience of domestic energy practices (Pink, 2012) or storytelling around energy systems (Moezzi, Janda, and Rotmann 2017), but we argue that the novel social relations that renewable energy systems enable should also be made experienceable. The second friction pertains to people's past experiences with public participation in the energy transition, which has led to an erosion of trust. Whilst ethnography is well positioned to understand and uncover people's judgments about past energy projects (Smith and High 2017), we argue that ethnographers should become active mediators and translators between people and institutions during the lengthy process of energy system innovation. Finally, we describe the frictions in the temporal mismatch between the long-term energy transition and short-term concerns of people. We argue that ethnographers should work to embed ethnographic engagements (Goodman 2018) in the functioning of local organizations to ensure continuity of collaborations beyond a single project whilst regularly making intermediate results of the long-term innovation process tangible and visible to participants.

CONTEXT: ENERGY PROSUMERS AND SMART GRIDS

The energy sector is highly technocratic, characterized by organizations and institutions invisible to the general public, who work to maintain the infrastructures that keep modern society running. In particular, the electricity grid is an esoteric architecture that is unintelligible to the average citizen, functioning through technical protocols operated by specialists in invisible control rooms using complex mathematical operations. However, research suggests this may change as more households install residential solar panels, own electric vehicles, and organize with their neighbors in energy communities or cooperatives (Koirala et al. 2016). Citizens will transform from passive energy consumers to pro-active prosumers who both produce and consume energy, actively participate and trade on local energy markets,

and adapt their energy practices based on techniques such as demand side response and dynamic energy tariffs (Calver and Simcock 2021). These changes are required to adapt to the dispersed and intermittent generation of renewable energy, which, unlike fossil fuel power plants, is distributed throughout the landscape and is uncontrollably dependent on weather conditions.

Furthermore, the electricity infrastructure itself is expected to undergo a fundamental transformation into a 'smart grid', using intelligent control mechanisms, weather forecasting algorithms, and digital platforms (Farhangi 2010). The social implications of these developments are yet underexplored, as people might have to adapt their domestic energy use patterns, use new technological innovations, and interact with novel organizations that take up new roles in so-called "smart local energy systems" (Ford et al. 2021). An increasing amount of research focuses on designing the user interaction with these systems, e.g., through smart meters or home energy management systems (Geelen, Reinders, and Keyson 2013).

The project in which we work is motivated by these developments, with the primary goal of designing an innovative smart energy platform. This platform would incentivize users to adapt their energy use patterns to alleviate the load on the local grid in return for financial compensation from the grid operator. Many of the project's partners and collaborators work to build the software and hardware required, with expected users being several large commercial parties with ownership over various energy assets (e.g., storage batteries and solar panels) and households from a local neighborhood. Besides technological development, there is also the question of social inclusion, which concerns the benefits for those households with the greatest need. Initially, it was assumed that those households might use the platform to make better use of their residential solar energy and potentially engage in practices like Peer-to-Peer (P2P) energy trading.

The households affected by the project are from a local neighborhood in Amsterdam South-East, a field site for our project. It is an incredibly diverse area, with around 70% of residents from a non-Western migration background. It also has considerable socioeconomic challenges, including energy poverty, little local economic activity, and a need for more social cohesion. The municipality of Amsterdam designated the area as a 'development neighborhood', signifying that the area needs extra attention from policymakers. We reflect that whilst it is important to report these, this can also have a stigmatizing effect on the residents.

The authors worked on the social inclusion side of the project, intending to learn about the needs of residents and formulate design requirements for the platform. From the beginning, there was a perceived gap between the smart energy platform and the likely needs of households, and the plan was to conduct early ethnographic field visits so that the findings might inform the engineering work, which was likely to proceed with or without the outcomes of our research. At the start, the project's technological, rationalist-economic framing was heavily emphasized compared to the

social dimension. To be able to provide a counterweight and input to these activities, our ethnographic fieldwork started with several intentions and assumptions:

12. to take the social needs, concerns, and values of citizens as a starting point, rather than the technology,

13. to avoid technical jargon as much as possible, and

14. to start with a focus on building rapport with local community centers and community leaders before focusing on the core research questions.

As the ethnographic vignettes in the next section will show, even these seemingly typical starts for ethnography proved to be arduous and intricate.

THREE VIGNETTES OF FAILURE

Urban Gardening

The first place I visited ("I", used in the vignettes, refers to the first author of the paper) was an urban gardening initiative that tailors specifically to local women and has the purpose of women's empowerment. The organization that manages the initiative operates multiple gardens in Amsterdam and is well known because of a documentary filmed about them some years ago. It seemed like a natural place to start, as people interested in gardening and greenery might have some affinity with the theme of sustainability, and thus also renewable energy. Several times a week, they organize a morning or afternoon where any local women can come to volunteer in the gardens, assisted by a garden coach who, in the process, helps women to find their personal power. Besides the potential connection with sustainability, their focus on empowering women from diverse cultural backgrounds aligned well with our interest in inclusivity, as there would be plenty of people to talk to who are not the 'usual suspects' in energy transition projects, i.e., older white Dutch men.

I decided to visit the garden on a Wednesday morning, which was open for volunteers to help. I was somewhat uncertain about my visit, as the place seemed intimate, and as a non-local male, I would certainly stand out and perhaps be unwelcome. Still, no women were in our research team, and we had to start somewhere. When I arrived at the garden, however, which was located in the courtyard of one of the characteristic, large apartment blocks, I was swiftly and warmly welcomed by the garden coach, who assured me that 'everyone was welcome'. She asked me why I was here and where I was from, as I was clearly not local. I explained that I was doing a research project related to energy and sustainability and that I was looking to speak to some people to learn more about the neighborhood, especially if there is anyone interested in renewable energy. The coach seemed a little unsure how to react. She was okay with it but didn't ask any more

questions. I felt that the fact I was a researcher created some distance between us, and it certainly did not serve to have more conversation. Still, she welcomed me to participate in the garden and help with their activities.

I worked in the garden for a few hours and interacted with the people there, mostly middle-aged women from Surinamese and other ethnic and cultural backgrounds. It was a warm environment of casual chit-chat and friendly banter – the Dutch word "gezellig" captures the atmosphere well. It did not seem appropriate to strike up a difficult conversation about research about energy transition or even ask them about other prevalent concerns in the area. Whilst it was a pleasant atmosphere and people made me feel at home, there was pressure on my mind to get the data and talk to people about energy. After all, I was not there for casual chit-chat but in my professional role of contributing to designing a smart energy platform. Still, ethnography takes time, and overall, it was a pleasant visit.

During another visit, I was having a cup of coffee with the group and met the founder of the initiative, who was curious to learn more about our research and purpose in the neighborhood. I explained that I was connected to the university, working on a research project in the area related to energy and inclusiveness. She was interested to in getting the details, so I explained about the smart energy platform that is developed nearby and how we were conducting ethnographic research to explore how this platform could serve the needs and interests of local citizens in an inclusive way. We were looking to get to know some people in the area, especially anyone interested in renewable energy, and I'd like to volunteer in the garden as a means of doing research and learning more about the area. The founder seemed hesitant and said there probably wasn't much to learn about energy from the people here. She further explained how researchers or students were visiting the area quite frequently. She asked me to email her with more information, and then she'd let us know.

We had some email exchanges, and a few weeks later, she communicated her decision: She would prefer us not to conduct our research in the garden, as it was intended to be a safe space for women. She didn't want anyone around who would be observing or studying people. Also, the fact that they have received quite a bit of public attention recently because of the documentary means that they must be quite selective in who they speak to. While she did not say it explicitly, we felt a mismatch between our interests and their activities: urban gardening is about social connection and participation within the local community, whereas our energy project was framed technically and informed by national and global concerns. The only connecting point is the intention of 'inclusivity', but there was no concrete idea of implementing this besides "we'd like to study and learn". Moreover, as a non-local male university researcher, I was somewhat out of place for an initiative focused on local women. If they get many requests from researchers and students to participate, then probably there'd be others with more relevant topics or who have more of a personal connection to the place.

Homework Supervision

Another place we'd learned about is a local community center that organizes homework supervision, other activities for local youth, and food bank services for homeless or unregistered people. We found various articles about them online and saw an interview with the founder on local television, who was considered a hero for the local community. It seemed like this place was central in some local, informal networks and that they knew a lot about the needs of people who were struggling to make ends meet. One afternoon, I visited the place and spoke to a woman I recognized as the founder who was interviewed on local television. I mentioned I was working on a research project and looking to learn more about the area and also about this particular initiative. She said: "oh I received a call from a student who wanted to visit us, is that you?" I said that that's not me. But it was striking that another student had contacted them to visit them at this same time.

She told me about their activities, about how they host after-school activities for kids, how the place is a second home for the children, and that many volunteers help her to do this: it's a real community place. She said they were a very central and trusted place for the people in the neighborhood. I mentioned that I was "working on a research project related to energy and exploring how the energy transition can connect more to the needs of people in this neighborhood and potentially help people dealing with energy poverty". She seemed appreciative but gave a neutral reaction, neither positive nor negative, and wished me good luck. Although the topic did not spark her interest, I felt that it could help that we wished to explore the needs of people dealing with energy poverty. I asked if I could visit them later if I had more questions, to which she said their door was always open. We exchanged contact details.

Later, I sent an email to ask if they needed help with anything mentioning that as part of doing our research, a graduate student and I would like to do volunteer work to give something back to the neighborhood. This way we could get started and get to know people. We got a positive reaction and were invited for a conversation. We spoke with several women who were in charge of the place, who were middle-aged and from various ethnic backgrounds, and they said they were happy with our proposal and explained that they could use help with homework supervision. They were curious to learn more about our research, and one of the women inquired: "how are you ever going to make the energy transition more inclusive?" She said it is a very difficult topic, and people don't know anything about it. She herself had just started looking into solar panels – the energy prices were very high as the Ukraine war just broke out – but most people are unaware of how to approach this or even start. We explained that our first step was to learn from residents' viewpoints, what they care about and need in this regard, and that we wanted to explore ways of making the topic more engaging and accessible.

They explained they were also working with a research team from another university to develop a 'wellness tracker' for the neighborhood. This tool measures

the level of well-being of the residents in terms and criteria that they find important. They explained that the wellness tracker project contributed to building social relations for the neighborhood, with the final outcome being interesting for anyone living in the area. We talked some more, and they said we could explore together how our project could also provide value like this. Still, they were skeptical about the 'smart energy platform' our project was developing: "if some old white guys come here 'to do energy transition,' it will generate a lot of distrust.", is the literal quote. They said clearly: "if you want to do research here, it has to bring something to the neighborhood". They also said that much research has been done in this area into issues like energy poverty, and people have become tired of talking to researchers about the problems they deal with daily. "We, and the municipality, know well enough what the problems are, we don't need more research. We need real solutions now."

Despite these doubts, they still welcomed our help with homework supervision, which we participated in a few weeks later. Unfortunately, the week afterward, the roof of the community center building collapsed, and homework supervision was suspended indefinitely, meaning we couldn't visit anymore. Reflecting on these visits, we were thinking: what do we offer this community? The wellness tracker they are developing with the other researchers is something tangible and interesting to anyone living in the neighborhood. At the same time, the smart energy platform from our project is something complex and technical, and the initial framing was aimed at people with at least access to solar panels, which we had learned were not even present in this area. How could this ever be made inclusive and interesting? Of course, we could hold a workshop or co-creation session on a theme like saving energy and providing a meal or gift card to participants, but this would not actually help to make the smart energy platform that we were developing inclusive while there is public funding going into this project for that specific purpose. While we had more email contact with this community center, our collaboration never fully got off the ground. We felt this was largely because of our project's perceived lack of usefulness and relevance to the local community.

Coffee Hour

The third community center I visited organized various events for the community, including coffee hour, yoga, bible reading for children, and more. Together with a graduate student, I decided to visit during one of the coffee hours on a Thursday morning, assuming it was open for anyone to visit – the available information suggested as much. We arrived at the place, a bit nervous from the previous experiences and unsure what the best approach would be, but we hoped to strike up a conversation with whoever was there. We decided to be very sparing with information and details about our research unless people asked for it, and we would try to listen and show interest in the people who were present. When we arrived, we

did not see anyone at the entrance and were unsure how to proceed. We decided to enter and cautiously went down the hallway, looking for someone to speak to. Not seeing anyone, we proceeded and entered a large room where the coffee hour was happening. About 15-20 people sat around the room, keeping social distance according to the COVID-19 regulations that were still in place. Mostly, they were middle-aged and elderly women of various ethnic backgrounds engaged in conversation.

We approached one woman who was pouring coffee and seemed to be in charge. We mentioned we were involved in a research project and wanted to learn more about the neighborhood, and we asked if we could sit down and hang around. Beforehand, we had explicitly decided not to mention energy transition right away as it hadn't been a very successful topic to talk to people about. She seemed unsure and suspicious and asked what our research was about, to which we explained that "we were curious to learn how local residents think about renewable energy," especially concerns related to the high energy prices at the moment. This did not satisfy her, and she asked very pointed and specific questions: "OK, but which organization are you connected to? How is this project funded?" We explained that we were connected to a larger research project that was related to the congestion of the electricity grid and that we were exploring how it could be done in an inclusive way. She seemed hesitant but said: "okay, you can sit down and listen, but don't expect people to want to talk about energy."

We sat down on one of the benches off the side. Because of the social distancing setup, we could not speak with many people, except one elderly lady who started chatting immediately with one of us. The other ethnographer sat somewhat awkwardly off the side of the bench, unable to join the conversation and out of speaking distance of anyone else, and so simply hung out and listened to what people were talking about. This continued for some minutes until a lady at the other side of the room exclaimed: "Who are these people, and why are they here? They didn't even introduce themselves!" She yelled quite loudly, and this caused some upheaval. Some others said, "it's okay, everyone is welcome." We hastily stood up, introduced ourselves, and mentioned why we were here. This calmed people down, but there was still tension in the room. We were unsure what to do from here, if we were welcome or not. After a few minutes, we decided to leave – we said goodbye, thanks for letting us in, and that we would leave now. Overall, we felt that our presence was intrusive, and we were not familiar with the social norms and what would be expected of us. It seemed like a more private space than we expected, and to talk about anything formal or impersonal felt wrong and off, yet we still had to do this to explain who we were, what we were doing, and why we were there.

After we left the place, a woman came running after us and urged us to wait. We had not seen her inside before. She told us she was the organizer, and very quickly apologized and said everyone was welcome. She explained she hadn't seen us come in; usually, she was at the entrance to welcome people, but she was away for a few

minutes. She emphasized that we were always welcome and could always contact her and wished us the best of luck in our research. She reassured us, but we still realized that we had not found the right approach to speak to people. We felt that we lacked an explanation, story, or narrative about the activities and intentions of our project in meaningful human language instead of technical jargon to explain why we were in this area and what we wanted to learn from people.

FRICTIONS FOR ETHNOGRAPHY IN THE ENERGY TRANSITION

This section highlights frictions for research and innovation in renewable energy – particularly for emerging smart energy systems. Moving beyond the specific aspects of our case, we interpret the general implications of these findings, connecting them to literature and theory.

Friction 1: The Invisibility of Energy Infrastructure and Lack of a Relatable Narrative

The vignettes illustrate the lack of a meaningful explanation about the nature and relevance of the smart energy project, which meant that our presence and interest had to be explained in technical jargon that was far removed from the daily lives of our participants. The story of the energy transition is one of rising CO_2 levels, technological innovation, and complex bottlenecks like grid congestion. The vignettes illustrate how this framing had little effect on the building of rapport or even inhibited it. Terms like 'energy transition', 'smart energy platform', and 'grid congestion' did not serve the purpose of making connections and building rapport, yet were indispensable in explaining our presence. We argue that this is because of people's traditional role as passive energy consumers, leaving the management of the system to technocratic organizations and experts. In general, people do not experience energy infrastructures as part of their social environment, apart from engaging in energy consumption within households, resulting in a lack of human-centered understanding of the functioning of the energy infrastructures.

Various academic studies have pointed out how the invisibility of energy infrastructure contributes to a lack of awareness around sustainable energy use and proactive engagement with energy practices (Pink 2012; Broms, Wangel, and Andersson 2017). Making these processes more visible, tangible, and meaningful is commonly seen as a necessary step in raising awareness and promoting sustainable behavior – e.g., through storytelling (Moezzi, Janda, and Rotmann 2017). This step is even more important considering that energy infrastructures are closely intertwined with institutions of governance and processes of political power (Boyer 2014) and can be mobilized to produce new forms of citizenship (Larkin 2013). Meaningfully opening up the black box of energy infrastructures is thus important not only for promoting sustainable behavior but also for enabling democratic accountability and creating insight into the social relations that energy infrastructures enable. This latter

aspect is even more true for emerging smart energy systems, which can enable new forms of community organization and social engagements.

Our findings show the lack of a relatable narrative around the relevance of innovative renewable energy systems that connect with the lived experience of people. This forms a barrier not only towards spreading awareness of sustainable behavior but also the emergence of new forms of community organization and social relations around smart energy systems. Our findings problematize the common assumption that people are interested in co-shaping their future role as 'proactive energy citizens' and show a 'chicken-and-egg' problem: the goal is to design an energy system in a way that is meaningful, tangible, and sociable to members of the most difficult-to-reach social groups, but to do so, the purpose of our research should be explained in a manner that is meaningful, tangible, and sociable to the participants.

Friction 2: Past Experiences of Public Participation in the Energy Transition

The second friction relates to how participatory projects in the energy transition are often organized and how citizens perceive the value of this participation. In a context like The Netherlands (but also in other places), there is a history of public participation in the energy transition, typically organized top-down. An example is the placement of wind turbines, where the municipality invites the local community to co-decide on a location. Too often, people have felt that their concerns were not sufficiently heard and considered, leading to a certain "participation fatigue", as one of our participants expressed. Another person reported that the experience felt like "putting a post-it on a moving train". In other words, people felt that the outcomes and direction of certain projects were already pre-determined by institutional officials, with limited space for real input from citizens. These concerns are well known and identified in academic literature, e.g., through analyses of how the 'public' is conceived, imagined, and constructed in a participatory process, thereby structuring the interactions and engagements in a certain way (Sovacool et al. 2020; Chilvers and Longhurst 2016). While the intention may be to enable citizens to participate in institutional decision-making meaningfully, real delegation of power is not guaranteed (Arnstein 1969).

During our fieldwork, we experienced how the energy transition is associated with troublesome projects in the past. When we mentioned our work in the energy transition to one man on the street, he exclaimed, "Ugh, don't start to tell me about it!" and proceeded to describe how the municipality retrofitted his apartment building with a new heating system, which led to higher energy bills – whereas the opposite was promised. This association hampered our ability to blend in and build relations, as people did not trust that participating in our energy-related research would lead to any useful or interesting outcomes.

Initially, we hoped that our ethnographic approach would avoid some of the problems associated with the more traditional approach. As it turned out, the

participation fatigue of people in this area pertained not only to projects initiated by the government but also to the presence of researchers and universities – a novel finding. One person expressed to us the concern that frequently researchers have come "to ask people about their poverty," which is a stigmatizing frame. Another response was, "so much research has been done on the problems, people are tired of talking about it. What we need now are solutions". It thus became clear that people in this area have been asked the same question multiple times, over and over, by different researchers, students, or professionals working at different institutions, unaware of each other's activities. It struck us that many people we spoke to were familiar with researchers visiting, which had resulted in skepticism regarding their activities and intentions. Overall, we found that participatory research

We interpret this as an experienced lack of reciprocity, where researchers come into the area to gather data to advance their research and meet their institutional requirements without 'giving back' to the community. In this way, well-intentioned research can result in a form of *data extractivism*. We reflect that it is important for ethnographers to consider their embeddedness in institutional structures and activities and what purpose their activities serve. In our project, while as ethnographers we work for real and meaningful involvement of people, the institutional structure merely requires a justification of the requirement of inclusiveness, and pushes to do this as efficiently as possible. As ethnographers, we still deal with this fundamental tension where research or participatory processes are initiated from the top down. We are accountable to the institutional structures within which we operate, which tend to depoliticize controversies and operate in a technocratic manner (Turnhout et al. 2020). These institutional interests might be only partly congruent, or even adverse, to those of the people we engage with in our fieldwork.

Friction 3: Temporal Mismatch in Energy Infrastructure Innovation

The third friction concerns the tension between three different, conflicting time horizons that play out in our research: 1) the tempo of long-term energy transition innovation, a more or less linear process stretching several decades into the future; 2) the procedural, technocratic organization of multi-year R&D projects through deadlines and deliverables; 3) the daily, weekly, monthly routines of the average person. We argue that these need to be adequately attuned – participatory and ethnographic engagements should stretch beyond the scope of a single project, and people should be able to meet their short-term needs while participating in long-running projects.

Starting with the first-time horizon, policy goals of CO_2 reduction for 2030 and 2050 create the need for a long-term perspective yet urgent initiation of innovation in infrastructural solutions. This means that results from current research might only become concrete and tangible many years from now. This long-term perspective fits well with a practice of slow ethnography and organic building of connections, in

contrast with the common necessity to conduct short field trips and deliver quick, actionable results. During this research, however, we experienced how the time horizon of our project still created the urgency to engage residents early to meet deadlines and match the pace of the engineering work.

As mentioned, our fieldwork was conducted in an interdisciplinary innovation project, with designer-anthropologists working with electrical engineers, civil servants, and social scientists. It was emphasized in the beginning that any relevant user-related insights would have to come quickly and early since much of the 'design' of the smart energy platform was already laid out, and construction of the relevant hardware and software components had to begin as soon as possible. The engineering work could not afford to wait many months for the ethnographic fieldwork to unfold slowly and organically and yield relevant data. This is surely recognizable for ethnographers working in industry or other contexts. However, we argue that the need for a long-term perspective and a slow approach is especially important in energy transition work. Since energy transition projects take a long time to implement, are often bound to a single location, and are a locus of political controversies, the risks are higher that social relations between citizens and institutions are damaged permanently, more so than in commercial product development. We argue that an ethnographic engagement in a particular area should stretch well beyond the scope of a single project and attune to the lengthy process of transforming the local energy system and infrastructure.

Another tension concerns the mismatch between this long-time horizon and the work routines and rhythms of the average person. When initiating an ethnographic engagement around a specific energy system, a significant challenge concerns articulating the relevance, nature, and impact of something that will not exist for a long time. This further underscores the need for a relatable narrative, as in the first friction, and the prioritization of reciprocal relations, as in the second friction. From our fieldwork, several participants responded how they do not have the time to invest in our research, using phrasings like "no time to worry about this", or "too busy with getting food on the table".

DESIGN ANTHROPOLOGY FOR THE EMERGENCE OF ENERGY COMMUNITIES

Building on the frictions described above, this section elaborates on potential pathways for mitigating them. We do this by elaborating on our design anthropology approach, exploring how ethnographers, researchers, or other professionals could intervene and work for structural solutions to these frictions. We briefly introduce our interventionist approach, describe how we facilitate the emergence of a local energy community in our research area, and interpret how this can address the frictions identified.

Our design anthropology approach is characterized by an intentional and reflexive stance concerning intervention. We believe ethnographers cannot be a fly on the wall, observing and mingling with their research participants without co-shaping the situation and events. Seen in this light, ethnography is also an intervention, especially in non-public spaces such as those visited during this project. Besides participatory ethnography, designer anthropologists use design interventions to conduct experiments and obtain an understanding of emerging sociocultural phenomena (Singh et al. 2021). Approaching these interventions with a reflexive attitude, a core principle guiding our approach is to consider "the moral implications of intervention" (Murphy 2016). Both ethnography and other design interventions are enacted with a certain intentionality and by a certain design, with certain potential outcomes in mind. An intervention is a means of 'giving form' (Murphy, 2021) to a context, thereby co-shaping how the rightness or wrongness of an action is considered. Our findings show how our ethnographic visits (i.e., the interventions) give rise to questions about the right- or wrongness of the visits themselves, the legitimacy of our presence in non-public spaces, the assumptions and purposes of our project, and reciprocity between ethnographers and research participants. An interventionist approach is bound to magnify and produce frictions and tensions, but we argue that ethnographers should take ownership of their interventions and the resulting consequences.

In the context of energy transitions, a key question becomes: what should be the role of top-down actors, if any, to intervene in local contexts to support, facilitate, or push the idea of an energy community? Energy communities are a recognized energy system entity in European Union policy. They can be loosely defined as citizen or community initiatives that adopt collective ownership and management over local renewable energy assets or systems. While energy communities are typically characterized by bottom-up actions and initiatives from citizens (Bauwens et al. 2022), the imperative of a just energy transition means that institutional guidance and involvement might be necessary. After all, bottom-up initiatives are not getting off the ground in areas like the neighborhood of our fieldwork, even though they are seen as a key avenue for residents and communities to participate and benefit.

We argue that a middle-of-the-way approach, where ethnographers enter a local context to establish long-term partnerships with citizens, provides added value. This includes not only relations between ethnographers and their informants but also ethnographers working as mediators and translators to establish relations between citizens and institutions. The slow building of rapport, the organic unfolding of social networks and connections while learning about the prevalent local customs and concerns, and reflecting on one's approach and embeddedness in the institutional context ameliorates the risks associated with either fully bottom-up or top-down action. Building social connections through informal engagements can subvert the coldness, impersonal nature, and rigidity of traditional, top-down, institutionalized participation. On the other hand, citizens or communities in

underprivileged contexts stand to benefit from the support that collaboration with professional organizations can provide.

To implement this in our research, we are collaborating with a local organization that represents local residents and supports local energy initiatives. Through this organization, which is part of our project consortium, we are connecting to a select group of interested local residents engaged with the energy transition topic. In a series of co-creative brainstorming sessions, we are exploring with these residents if, how, and under what conditions a local energy community could be established. Among other things, this community would take ownership of installing solar panels on the local apartment buildings and ensure a fair distribution of the benefits for all residents. While it is the intention that the local community will fully take ownership and responsibility, our role is to provide practical support by organizing co-creation sessions, providing pointers for discussion, and assisting in formalizing the idea. This would allow us to build long-term partnerships between us, local organizations, the newly founded energy community, and externally partnered institutions. The local organization can become an opportunity to explore citizen ethnography (Badami and Goodman 2021). While the initiative was started from the top-down, it appears as a promising avenue for a local energy community to emerge in a place where it otherwise would not have.

This pertains to another key concept in our design anthropology approach – emergence. There is a creative tension between the future orientation of design and the anthropological interest in understanding the past and present (Otto and Smith 2013; Singh 2019). Design anthropology has the conceptual tools to study empirical sociocultural phenomena and consider what kind of future social and material arrangements are emerging in a dialectical manner. This could include the emergence of new types of energy communities through the collaboration between ethnographers and residents. Such collaborations would ideally serve various purposes: supporting citizen-led energy initiatives, contributing to a just energy transition, and generating transformative academic knowledge through action (Otto and Smith 2013; Singh et al. 2021). Design anthropology as an approach seems well-positioned to contribute to these purposes.

Finally, we provide several concrete pointers and directions for how our proposed design anthropology approach can address the three frictions identified. While we only briefly indicate these directions, which we intend to explore in-depth in our future research.

1. The Invisibility of Energy Infrastructure and Lack of a Relatable Narrative

Designer anthropologists can conduct interventions to make invisible energy systems more tangible. Through design experiments and ethnographic fieldwork, in a similar fashion as (Pink et al. 2020), the meanings that people associate with renewable energy systems may be studied and mobilized to reframe techno-economic understandings of smart renewable energy systems. By supporting and

collaborating with residents to establish an energy community, designer anthropologists may pay attention to what tensions, frictions, and controversies are emerging to explore how the social dimension of energy systems may be made tangible and experienceable through design interventions.

2. Past Experiences of Public Participation in the Energy Transition

Ethnography as a means of building informal connections and trust is better positioned than traditional top-down participatory methods in the energy transition. Still, to deal with our challenges, the issue of reciprocity and the value of participation should become an even greater priority for ethnographers. To this end, it might be necessary for ethnographers to become more activist and intervene not only in the local context but within the institutional context itself (Levin 2019). Ethnographers should become mediators and translators on behalf of people and sensitize institutional structures and officials to their needs and perspectives. This could involve advocating monetary compensation for participants to enable them to collaborate with professionals on equal grounds. By contributing to building long-term partnerships, ethnographic practice can become embedded in local organizations.

3. Temporal Mismatch of Energy Infrastructure Innovation

Renewable energy innovation initiatives aiming to involve citizens for the long term should ensure continuity of social relations and collaborations, taking an infrastructural perspective (Mendonca 2022). As indicated above, it might be necessary for designer anthropologists to become more activist and intervene within the institutional context to advocate for structural changes. Such structural changes include institutionalizing the need for slow ethnography and embedding ethnographic relations in local organizations. Furthermore, to cater to the short-term needs of the average person, it is crucial to provide regular updates, outputs, and results of the innovation process in a meaningful and understandable form for the common public. This fosters a sense of progression, which is crucial to retain support and engagement for the long term.

CONCLUSION

Smart energy systems are expected to play an essential role in energy transitions. However, our ethnographic fieldwork shows how the framing and understanding of these innovations constitute a barrier for people – not only to adopting new energy technologies but also to their participation in ethnographic research. Our findings show the necessity for ethnographers to reflect on the institutional structures within which they operate and how ethnographic engagements enact not only the encounter between two people but also between institutions and citizens. We highlight the lack of relatable narratives and socially experienceable implications of smart energy

systems, the perceived lack of value of public participation in the energy transition, and the conflicting temporalities of long-term innovation and present needs. Using a design anthropology approach, we highlight how ethnographers can mediate between institutions and local groups to support the emergence of energy communities. We argue that ethnographers working in energy transitions should advocate for embedding ethnographic practice in local organizations to ensure continuity of social relations and collaborations, acting as mediators and translators in the process.

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