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Narratives of Resilience: Coping with Power Outages and
Blackouts in Kyiv

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Abstract

How do urban communities adapt when the very infrastructure they rely on is suddenly compromised? This study explores how Kyiv's residents navigated power outages and blackouts during the challenging winter of 2022-2023, adjusting their routines and innovating creative technological workarounds in response to constant interruptions in electricity, heating, mobile communication and internet connection. Through auto-ethnographic fieldwork combined with narrative interviews with 11 participants, the research examines the shared and unique ways local residents made sense of these disruptions at both individual and community levels. Findings suggest that the residents have creatively transformed socio-technical vulnerabilities into resilience through the development of self-sufficient energy solutions, symbolizing a bottom-up shift in agency. This work speaks to the resilience of urban communities who utilize alternative power sources, informal networks, and grassroots ingenuity as a means of empowerment, both in social and technical sense. The findings reflect the socially-constructed techno-political culture of resilience, where social connections and practical tools helped the local residents shape their own responses to uncertain conditions of power outages and blackouts. This study invites further attention to how communities worldwide might adapt and respond in a world increasingly reliant on interconnected infrastructure and yet vulnerable to its breakdowns.

Abstract (German)

Wie passen sich urbane Gemeinschaften an, wenn die Infrastruktur, auf die sie sich verlassen, plötzlich ausfällt? In dieser Studie wird untersucht, wie die Bewohner:innen der Stadt Kyjiw während des herausfordernden Winters 2022-2023 mit Stromausfällen und Blackouts umgingen, indem sie ihre Routinen anpassten und kreative technische Lösungen fanden, um die ständigen Ausfälle von Strom, Heizung, mobiler Kommunikation und Internetverbindung zu bewältigen. Durch die auto-ethnografische Feldforschung in Kombination mit narrativen Interviews mit 11 Teilnehmenden untersucht die Studie die gemeinsame und einzigartige Art und Weise, wie die Bewohner:innen diesen Störungen sowohl auf individueller als auch auf gemeinschaftlicher Ebene die Sinne einordneten. Die Ergebnisse deuten darauf hin, dass die Bewohner:innen soziotechnische Vulnerabilitäten durch die Entwicklung autonomer Energielösungen kreativ in Resilienz umwandelten, was einen “Bottom-up”-Übergang der Kraft symbolisiert. Diese Arbeit ist ein Beweis für die Resilienz urbaner Gemeinschaften, die alternative Energiequellen, informelle Netzwerke und Graswurzel-Einfallsreichtum als Mittel zur sozialen und technischen Ermächtigung einsetzten. Die Ergebnisse spiegeln die sozial konstruierte technopolitische Kultur der Resilienz wider, in der soziale Verbindungen und praktische Hilfsmittel den Bewohner:innen halfen, ihre eigenen Lösungen für die unsicheren Umstände von Stromausfällen und Blackouts zu finden. Diese Studie lädt zu weiteren Überlegungen darüber ein, wie sich Gemeinschaften weltweit, die zunehmend von den vernetzten Infrastrukturen abhängen und dennoch anfällig für deren Ausfälle sind, anpassen und reagieren können.

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1. Introduction

On **February 16, 2023**, after a 25-hour journey in an old sleeping car of the direct train that runs daily from Hauptbahnhof Wien (Vienna main train station) to the main train station of Kyiv, I stepped onto the platform of the gray train station of my hometown, where I grew up and spent the first 20 years of my life. Such a long trip home at that moment was due to the fact that at the moment of my journey civilian flights to Ukraine had been canceled for almost exactly a year and the only objects flying in Ukrainian airspace since February 24, 2022, were the Russian missiles and unmanned drones launched to bomb the Ukrainian cities. It was the second time I visited the capital since the beginning of Russia's full-scale invasion of Ukraine. I was nevertheless glad and somewhat "lucky" that I still had a physically existing "home" to go back to – a catch-all word for a space where a lot of physical and immaterial things have intertwined in a single way to create *that* feeling of being home.

On **February 24, 2022**, the first bombings and airstrikes on major Ukrainian cities began early in the morning as Russia launched a full-scale invasion of Ukraine. Over 6.3 million Ukrainians have sought refuge abroad as refugees or asylum seekers, while nearly 3.7 million remain internally displaced, having been forced to leave their homes (UNHCR, 2023). Major cities, including the capital, Kyiv, have withstood direct attacks and remained outside the occupied territories. Despite that, the residents of the big urban settlements have been continuously experiencing near-daily terror attacks on civilian and energy infrastructure, with frequent air raids involving missiles and drones causing explosions almost every night.

A year later, as I planned my routine family "check-up" visit, I expected to see boarded-up windows – visible reminders of the destruction of the residential buildings in the capital as a result of massive indiscriminate air attacks against civilian infrastructure; to hear the sound of air raid sirens; and to observe the sandbags and barricades on the streets of the city as a symbols of preparedness to unpredictable conditions. However, I did not expect to see the city plunged into almost complete darkness. On my way home from the train station, I could barely recognize the once familiar surroundings — almost completely dark and empty public spaces due to minimal street lighting. The reason for such measurements was preserving the scarce electricity left by the gradual destruction of the nation's energy infrastructure as a result of the military conflict.

Since **October 2022**, targeted air strikes on civilians and energy infrastructure have become a commonplace, leading to unpredicted power outages and prolonged large-scale blackouts in winter of

2022-2023 in many regions of Ukraine, including Kyiv, the country's largest urban area with over 3.0 million residents, as of 2024 (World Population Review, 2024).

During that period of time, the residents of the capital faced an unprecedented wave of power outages, as more than 50% of the energy infrastructure of Ukraine was damaged during that period (World Bank, 2023). Due to widespread blackouts across much of the country, hundreds of thousands of civilians (predominantly in urban environments) were often left without electricity and water supplies. As a result of prolonged absence of power, mobile and internet connection were likewise frequently disrupted, as the cellular towers also relied on electricity to operate. These disruptions of power supplies have often resulted in large-scale blackouts that could last several days (Schreck & Arhirova, 2022). For many locals, it was the first time they had experienced prolonged blackouts on such a scale.

By breaking down power distribution and water supply services, the purpose of the continued air strikes against civilian infrastructure and electricity grids was to gradually demoralize the local population. These efforts, nevertheless, by and large have failed, as the locals have resisted by utilizing alternative technology to keep their lights on and maintain electricity and connection (Pietralunga, 2023). While the media covered the power outages, the details were often missed—the challenges the ordinary people had experienced to manage everyday tasks and move on, not least by implementing a range of technological workarounds.

During the next few days of my visit in February 2023, to my surprise, I observed these efforts — invisible during the moments the electricity was running and visible when the power disappeared. Despite the daily power cuts and prolonged absence of power, Kyiv has seemed to function to a remarkable extent: civilian infrastructure, such as administrative units, schools, universities, as well as local business such as cafes and restaurants, groceries shops and shopping centers, were functioning as usual, as the locals quickly switched to alternative power sources (often generators and portable power stations) on demand if a power outage occurred.

As I walked around the city, I asked myself how this dependency on centralized energy infrastructure in urban areas intensifies the impacts of power disruptions and blackouts. I was curious how the residents have adapted, often through personal resourcefulness, adjusted routines, technological solutions, and grassroots community-led efforts. I was interested in how this socially-constructed technological resilience to blackouts has contributed to shaping socio-political resilience in response to the multiple vulnerabilities produced by the ongoing challenges of the loss of power amid the military conflict.

The reality of modern warfare has exposed how heavily infrastructure and technological dependence can intensify vulnerabilities of contemporary urban societies. In this context, Science and Technology Studies (STS) study the ways how energy infrastructures and digital networks, while offering conveniences and efficiencies, also create new points of vulnerability and risk for the modern technological societies (Bijker et al., 2014). These socio-technical vulnerabilities become particularly visible under conditions of military conflict, as modern war tactics often aim at targeting critical infrastructures, such as energy, telecommunications, and internet systems, with the purpose of destabilizing daily life of communities, by disrupting essential services for the civilian population.

For the residents of Kyiv, this winter has become a season of learning and creativity. Some acquired battery-powered devices, small generators, or portable gas stoves, while others organized routines around the limited hours of electricity. Many had to restructure their daily routines entirely—reserving precious electricity hours for working, cooking, charging devices, and laundry. Common spaces like cafés and shopping malls became “socio-technical hubs” where people could find warmth, light, and a place to recharge, not just their devices, but their spirits.

Despite observing alternative power supply devices in various urban spaces — visible physical symbols of adaptation and resilience of the local population to the blackouts — the generators and power stations could not tell a story behind their usage on a daily basis. There was an interest to hear and expose the voices of the local residents – the agents of *em-powering* solutions; to explore the situated experiences of socio-technical adaptations, where local knowledge, ingenuity and creative technological adjustments often intertwined to maintain the semblance of a normal life amid uncertain conditions.

The term *em-powerement*, as spelled, is used throughout the study to reflect the multifaceted notion of power in both technological and social sense. By *em-powerement* I mean various ways the local residents self-empowered themselves often through creatively repurposing the existing technological devices to *a) generate power* (in a very plain physical essence: electricity) to keep their daily (electricity-dependent technological) routines on, thereby fostering their *b) emotional empowerment* of coping with power cuts and blackouts by *c) shifting the agency of power* (in both material and immaterial sense) in their hands. The latter reflects the ability of the locals to proactively react and take action to respond to and cope with the disrupted centralized electricity supplies on a grassroots lay-expert knowledge level. Coping tactics often envisaged creatively utilizing and experimenting with various alternative technological devices and resources as a means of em-powerment in both technological and social sense.

The first wave of blackouts lasted until spring 2023. By then, conditions had begun to stabilize somewhat, and it was an opportune time to delve into the lived experiences of these adaptations. Despite the short-term visit in February of 2023, inspired by the resilience I have observed in that moment, I conceived the idea for this research. It was this unique period of “living off the grid” for frequent and prolonged periods of time. That moment seemed to be ephemeral in its nature and I wanted to capture it.

It was likewise a point of time marked by uncertainty but also, as mentioned, by profound local grassroots ingenuity and resilience—qualities that would drive the central questions of this study: *How did urban residents make sense of, adapt to, and navigate their lives despite power disruptions?* I was also curious how ordinary people often having little (to no) technical knowledge have themselves become the lay experts and the *agents of power*, coping with power outages on a daily basis. How the knowledge was disseminated, where did they get the necessary know-hows and skills, who could access and afford alternative technology solutions, if so. After all, I was curious to explore how “living off the grid” was for them? This question also reflects the main research question of the study: *How do the residents of Kyiv make sense of their experiences of power outages and blackouts and their ways of coping with it?*

Therefore, *the aim of this master's thesis is to investigate the lived experiences and coping strategies of Kyiv residents as they navigated frequent power outages and large-scale blackouts in the winter season of 2022-2023.* Throughout this study, both technological and socio-political resilience of modern technological societies will be questioned and explored.

In order to answer the main question, a qualitative methodological approach was conducted: a self-reflexive three-week ethnographic fieldwork (Law, 2000) in **July 2023** in the city of Kyiv, combined with narrative interviewing (Czarniawska, 2004) of eleven local residents about their experiences of navigating the lives through blackouts in winter. The choice of methodological approach aimed to capture not only the diverse ways in which the local residents coped with power outages but also diverse ways of narrating their experiences and multiplicity of interpretations they constructed around these disruptions.

By examining how individuals make sense of these disruptions, I will look not only at the practical ways people coped but also the symbolic and communal meanings they attached to these experiences. These include the analysis of the narratives of resilience (Vale and Campanella, 2005), adaptation, and community support. Exploring these dimensions of resilience will be crucial for understanding how power disruptions shape and redefine everyday life of modern citizens and reinforce individuals' sense of agency.

Overall, this research hopes to provide a glimpse into a specific spatio-temporal moment—the first winter of widespread power outages and blackouts in Ukraine (2022-2023)—a snapshot of the everyday realities faced by urban residents of Kyiv, who were actively reshaping their lives around uncertain power conditions during this period. In terms of academic contribution, the results of the study will reflect the broader socio-technical impacts of energy dependency in conflict-affected areas, detailing on how social relations as well as human-technology interactions can be (re)shaped in an urban war setting.

This **thesis is structured in the following way**: I will first discuss the relevant literature strands, including infrastructures in social sciences, human-infrastructure interactions in urban environments, vulnerabilities of modern socio-technical cultures, infrastructure failures and social studies of urban resilience. In the next section, I will introduce the context of the study, including research questions, and explain how this research contributes to the existing studies in social sciences.

This will be followed by exploring sensemaking theory, feminist postcolonial STS languages of “*situated knowledges*” (Haraway, 1988) and “*matters of care*” (Puig de la Bellacasa, 2011) in the context of situated use of alternative technologies performing a *caring* function. The concepts of *tinkering*, *bricolage* (Bijker et al., 2014) and *jugaad* (Radjou et al., 2012) will be likewise explored to look into local ingenuity, and playful experimentation with the resources at hand to produce practical workarounds and efficient solutions to maintain lives as close to the normal as possible during power outages and blackouts in urban settings.

In the next section, I will discuss methodological approaches, with a focus on the (auto-)ethnographic component of the study as well as the narrative interviews. I will discuss the limitations of the study, including ethical considerations of interviewing the locals and my positionality. After that I will move to the core part of the research—empirical findings, which I call a “kaleidoscope of narratives” – a collection of blackout survival stories, based on the insights, reflections and experiences the local residents recalled and shared with me.

In the final discussion section, I will synthesize the key findings from the study and situate them within the broader theoretical and practical frameworks. This section will address several core themes, such as adaptation and resilience, human agency and em-powerment through technological adjustments in crisis situations, the formation of techno-political culture of resilience as well as reflections on the spatio-temporal context of this study.

2. Literature Review

The literature review is structured in a way that tells a coherent story. I will start by looking into infrastructures (as both human and non-human technological assemblages) in social sciences and their key features. I will then delve into the agency of infrastructure in constructing identities and its dynamic interaction with humans and urban environments. Next, I will explore what happens when infrastructures fail or are deliberately disrupted in urban environments, and how societies respond by enacting resilience mechanisms, including narration and performative storytelling.

2.1. Infrastructures in Social Sciences

Understanding **infrastructures** and their role in contemporary societies has been an object of study in sociological research, anthropology, human geography and urban studies. When looking at a concept, I always attempt to start with its etymology, because the meaning of the term is implied in its origin and can explain a lot from the very beginning. The Oxford Etymology Dictionary (Onions, 1995) explains the lexical token *infrastructure*, deriving from Latin words *infra* (from Latin “below, underneath” – p. 473) and *structura* (from Latin “a fitting together, adjustment; a building, mode of building” or “arrangement, order”), means “the installations that form the basis for any operation or system” (Etymonline, n.d.), whether under “system” we understand something small or anything as large as a state or country.

In the 1950s, however, the term “infrastructure” was mostly rendered in military context and designated not only military facilities, but also airports, bridges, highways, and power plants, i.e. everything that could be regarded as “potential targets for strategic bombing” (Henke and Sims, 2020, p. 9). With nation-states becoming the most common form of political organization in the twentieth century, infrastructures acquired more visibility from the economic perspective and started to be regarded as “capital base” (Henke and Sims, 2020) and the sign of a nation’s technological advancement. There is a generally acknowledged profound interconnectedness of infrastructures and (national) security (Farrell et al., 2004). Alff (2021) notes that there is an increasing tendency in academic literature to render infrastructures in the context of “desirable future”, viewing these socio-technical systems as “standard-bearers” of modernization (Alff, 2021, p. 633) and the “icons of stability and progress” in contemporary societies (Gupta, 2018, p. 62).

In science and technology studies (STS), much of the attention has placed to the **physical materiality** (Latour, 2007; Graham, 2010) of infrastructural systems, their deep **embeddedness** in socio-technical landscapes (Star & Ruhleder, 1996; Star, 1999; Star & Bowker, 2006; Goldthau, 2014, Baptista, 2018), **invisibility** and **vulnerability** of infrastructure in contemporary technological cultures (Star, 1999; Larkin, 2013; Graham, 2015). In this regard, I invite the reader to look at infrastructures through the lens of social sciences, and in particular, STS, insofar as these academic fields provide us with a narrower interpretation and understanding of infrastructural systems, their relationship with citizens, and their role in social environments.

In STS, sociology, human geography, anthropology and urban studies it is quite common to study infrastructures as the interaction of humans, spaces, and objects and as a basement within which modern social and economic systems can operate (Graham & Marvin, 2001, p. 330). For example, French sociologist and STS scientist Bruno Latour (2005, p. 194) views infrastructure in terms of its physical materiality, and from an actor-network theory (ANT) point of view, regards infrastructures as a large network or an assemblage of various actors which make this *system*¹ operable. In this regard, Graham (2015) also emphasizes that **humans are part of infrastructure**.

Similarly, conceptualizing infrastructure, Slota and Bowker (2017, p. 531) view it as “not so much as a single thing”, but rather as a complex phenomenon designating “a bundle of heterogeneous things (standards, technological objects, administrative procedures) [...], which involves both organizational work as well as technology”. Edwards et al. (2009, p. 369) understand infrastructures as socio-technical arrangements, in which „technical, political, legal, and/or social innovations link previously separate, heterogeneous systems to form [a] more powerful and far reaching network”. In this way, one can understand infrastructures as the articulation of more or less stably connected elements, the sociotechnical implications of which accumulate over time.

In the following, I will look at the most frequently discussed features of infrastructure systems in social sciences, and, in particular, how they speak to and often echo each other. These features are key for understanding the role of infrastructures in contemporary societies in general and will lead us smoothly to discussing how infrastructures perform in urban environments and what happens when they fail to do so.

a) On Materiality

¹ Infrastructure as a system *per se*.

Infrastructures are inherently material in their nature (Henke and Sims, 2020). They constitute physical assemblages of wires, cords, columns etc. - all of these are the things that construct it and are literally *infra* (below, underneath) the *structure*. These physical assemblages are in constant need of maintenance and repair to function (Henke and Sims, 2020). The materials used (e.g., metal, plastic, concrete) also determine the system's durability and maintenance needs. Even human bodies are also regarded as infrastructure in gender studies of urban infrastructure: "social and material work of the body helps to build, develop and maintain cities through gendered infrastructures in the everyday" (Truelove & Ruszczyk, 2022).

Generally, it has become a common trend in the literature on infrastructure studies to acknowledge materiality of infrastructures, because these systems are often regarded as ephemeral, unnoticed and taken-for-granted. For example, in his study on "*The Politics and Poetics of Infrastructure*" anthropologist Brian Larkin (2013, p. 329) notes this **invisibility of materiality** as one of the inherent features of infrastructures: "We often see computers not cables, light not electricity, taps and water but not pipes and sewers" - a "system of substrates" (Star, 1999, p. 380 as cited in Larkin, 2013).

Acknowledging this physical materiality is crucial for understanding how these socio-technical assemblages are embedded within different social, political, and economic contexts, which in turn shapes how these infrastructures are developed, maintained, and experienced by different communities.

b) On Embeddedness

That infrastructures are both being shaped and shaping the social and organizational order has been reiterated in one of the classical readings by Bowker and Star (1999) and in many other academic works concerned with these socio-technical frameworks (Star & Ruhleder, 1996; Graham, 2001; Larkin, 2013; Graham, 2015; Baptista, 2018).

In science and technology studies, infrastructure is rendered as the part of a socio-technical system and is never a stand-alone organism, since it reflects certain socio-technical and political order and it is actually constructed to create, shape and maintain it (Henke & Sims, 2020). For instance, Latour (2005) renders infrastructure as literally to *structure* something, the term borrowed from architecture. Star & Bowker (2006, p. 381) explain the embeddedness of infrastructure in a way that it is "sunk into and outside of other structures, social arrangements, and technologies" and is often constructed to perform **standardization and classification** (Bowker & Star, 1999). So a "classical" way to understand the

embeddedness of infrastructures is to acknowledge their deep pervasiveness in social practices (Star, 1999; Star & Ruhleder, 1996; Baptista, 2018).

Speaking of the link between embeddedness and invisibility of infrastructure, in the study on complex infrastructure systems in Los Angeles, Varnelis (2008) highlights how they are embedded in the urban fabric and often overlooked by residents. The same narrative is particularly relevant to the energy infrastructure. Andreas Goldthau (2014, p. 138) notes that there is a “deep embeddedness of energy infrastructure in larger socio-technical contexts”. And because infrastructure is embedded in contemporary technical cultures, it is often invisible, let alone it fails to function in a proper way.

c) On (In-)Visibility

A lion's share of critical infrastructure studies outline (in-)visibility as one of the prominent features of these sociotechnical systems (Graham, 2015; Anand, 2020; Starosielski, 2012; Henke and Sims, 2020; Larkin, 2013). By and large, infrastructure plays a crucial yet often unnoticed role in society (Frischmann, 2013). As transparency or invisibility of infrastructures is often linked in many works to the degree of technological stability of a particular social unit (be it a local/regional community or a nation-state), much of the studies on engineering cultures and risk society focus on maintenance and stability of power and communication infrastructures which care for indeed “transparent” services of our everyday lives, such as electricity and internet.

Common narratives of the studies on infrastructure in anthropology, human geography and sociology reflect on infrastructures as technoscientific systems securing social stability, which render visible only when the systems fail (Bijker et al., 2012). This invisibility is frequently compared by a number of scholars to “black boxes”, which are connected to each other, although mostly remaining invisible to people - again a throwback to the narrative of materiality of infrastructure – while some things are visible to humans, certain things remain invisible, particularly when the system functions smoothly.

By and large, infrastructure is a system that remains to be an invisible background to most people on a regular basis (Star, 1999; Graham, 2010). It ensures the comfort of our lives in general, just like electricity infrastructure and transport infrastructure and people do not notice them until a certain point, usually, until they break down, which is, as Graham and Thrift (2007, p. 8) call it, “deep taken-for-grantedness and invisibility”. Further reflections on (in-)visibility of infrastructure will be touched upon as a starting point when discussing the implications of infrastructural breakdown.

2.1.1. Infrastructural Citizenship: (De-)Constructing Identities

That infrastructure is the backbone of any modern society and present literally everywhere in our everyday lives has been discussed in the previous section. Visible to a human eye or not, infrastructural networks are vital for providing the essential systems and services as well as organizing everyday lives of modern technological cultures (Larkin, 2013, p. 330) in a way that they “bundle together water, energy, people, and streets into a series of networked infrastructures that define modern life” (Graham, 2001 as cited in Larkin, 2013, p. 330).

In doing so, not only does infrastructure (de-)construct daily life, but also plays a crucial role in enabling individuals to fully exercise their rights and responsibilities as citizens. The term used in academic literature to refer to it is “**infrastructural citizenship**” (Lemanski, 2020) and is largely applied in studies of interactions and “co-dependent relationship” (Lemanski, 2020, p. 116) of infrastructure and citizens in the fields of sociology, urban and political geography and development studies (Painter & Philo, 1995; Staeheli, 2010; Speer, 2016). The concept focuses on how access to and the quality of infrastructure (such as transportation systems, water supply, electricity, and digital networks) affects individuals’ ability to participate fully in society.

In her article on infrastructural citizenship, Charlotte Lemanski (2020) examines how infrastructure influences citizenship in Cape Town, South Africa, exploring how residents engage with and contest their access to urban services. “Infrastructural citizenship” is proposed as a new analytical framework and conceptual tool to analyze urban life and its dynamics, and how “citizenship is embodied in infrastructure for both citizens and the state” (Lemanski, 2020, p. 115). In this regard, citizenship is not limited by the citizens of the state *per se*, rather this terminology refers to all the urban dwellers who have some kind of relationship with the state (Lemanski, 2020, p.116) and expect the state to provide infrastructure services to them. Thus, infrastructure can be viewed as a mediator point or as a tool using which the state provides services to its citizens and enables them to exercise their citizenship.

One of the key aspects of the studies of infrastructural citizenship includes the point of **inclusivity** and **access**. This often includes the questions of who gets access to infrastructure, how, at what time and, most importantly, how infrastructure can exclude and whose lives are thereby neglected? (Graham, 2015; Ramakrishnan, 2021) Recent research of socioeconomic inequalities in infrastructure access focuses mostly on marginalized and vulnerable social groups, exploring factors like socio-economic status, race, gender, geography and space, and what happens when individuals are unable to access infrastructures they need to maintain their normal lives (Dilworth, 2005; Graham, 2015; Baptista, 2018; Mason, 2023).

For instance, Salamanca (2015) examines how the road infrastructure, namely, Road 443 in the West Bank serves as a “tool for spatial control and segregation”, profoundly affecting Palestinian citizens. Road 443, constructed in the 1970s to serve as a local road, later became a critical route connecting Israeli settlements in the West Bank with Israel. During the Second Intifada in the early 2000s, security concerns led to severe restrictions on Palestinian access to the road, sparking legal and social disputes. These restrictions highlight the broader challenges Palestinians face regarding mobility and infrastructure, significantly impacting access to work, education, and healthcare. Salamanca (2015) emphasizes that infrastructure, like Route 443, not only serves as a functional system but also reinforces segregation. This case is one of the examples of how infrastructure can simultaneously empower certain groups while marginalizing others.

Iva Peša’s (2019) study also explores the challenges and dynamics related to water infrastructure in Kitwe, Zambia. The focus is on understanding how water availability (or lack thereof) shapes residents' experiences and their sense of inclusion in the urban environment.

Likewise, Charlotte Lemanski (2011, 2018, 2019, 2020) also builds her narratives about infrastructural citizenship around the question of (in-)access to infrastructural services and how socio-economic inequalities are manifested through this exclusion. In the afore-mentioned study of the South-African state providing public housing and necessary network services in Cape Town after the apartheid policy had come to end, the construction of the state-citizenship relationship through inadequate infrastructures is particularly visible. As a result of the inadequate housing spaces the urban dwellers of Cape Town were provided with, they adapted and literally extended their living spaces themselves, thereby performing “citizenship-in-practice”, which has eventually led to the formation of “new political identity” (Lemanski, 2011, p. 120). Since the state could not provide them with an adequate level of housing infrastructure necessary to meet the needs of the urban residents, the residents took care of this matter and fixed the issue themselves. In the study, Lemanski (2021) highlights how interactions with infrastructure (re-)produce citizenship identity and urban life *per se*.

Olivia Mason (2023) examines how colonial infrastructures such as walking trails, roads, and pathways were constructed to serve colonial interests in the MENA² region, exploring how walking trails and other forms of infrastructure enabled or restricted movement. She delves into both material and immaterial aspects of these infrastructures, considering their physical presence as well as their symbolic and cultural significance, i.e. how these infrastructures have been inscribed with meanings and memories

² Middle East and North Africa

that persist long after the colonial period. In Mason's (2023) study, walking trails are not merely leisure paths but are deeply embedded with nationalistic elements, shaping and reflecting the political narratives and identities of the regions they traverse.

Amin (2014, p. 137) also speaks about infrastructure's role in formation of national identity, noting that all these sociotechnical assemblages present in humans' lives "appear not only as subjects of interest in their own right, but also as matters implicated in the making of urban functionality, sociality and identity". Likewise, Baptista (2018, p. 32) views the role of infrastructures in terms of "nation-building, modernization and development, as well as in the making of modern citizens".

Generally, in the studies of infrastructural citizenship, a strong accent is placed on the role of infrastructure and (in-)access to it in constructing political identity (Graham, 2015; Salamanca, 2015; Lemanski, 2021; Mason, 2023). Even more, as discussed in academic literature, infrastructure appears to be a mediatory point of state-citizen relationships, performing citizenship as it directly impacts the daily experiences, social equity, and techno-political dynamics within a society. After all, (in-)access to quality infrastructure determines individuals' quality of life, their ability to access essential services, and engage in civic life. It can question and reshape power relations in shaping the distribution of opportunities and resources, highlighting and often exacerbating social and economic inequalities, particularly in times of crises.

2.1.2. Humans, Infrastructures and (Cyborg) Cities

As I go through the academic literature on infrastructures and their role in society in general, it is important to narrow down the kinds of infrastructures I am interested in and, above all, in what geographical and spatial contexts. This section, thus, narrows its focus specifically to the studies of (urban) infrastructure and how it shapes experiences of everyday lives of city dwellers in urban environments. By doing so, my objective is to come closer to the case-study of this research, which seeks to explore how everyday urban lives of the city dwellers are affected by inability to access urban infrastructure services, with an emphasis on the loss of power and connectivity.

According to the United Nations, 55% of the global population currently resides in urban areas, a figure projected to rise to 68% by 2050 (United Nations, 2018). Urban areas, characterized by their dense populations and intensive economic activities, place unique demands on infrastructure. In urban spaces, the functioning infrastructure is of even more importance for the urban dwellers, as it performs the flow of humans, energy, information, waste water, and commodities in urban areas (Graham, 2010, p. 4). As

cities are the “sites of both technological and social density” (Graham, 2015), this symbolism of modern infrastructures in urban environments is often established on one of the Enlightenment ideals of controlling nature through technological and scientific progress (Graham, 2010).

Urban infrastructure, thus, constructs a broader system of facilities and services that shape experience of living in urban environments, turning the daily experiences of urban residents into “**infrastructural lives**” — Stephen Graham (2015), a British researcher of urban studies and city life, has edited a collection of studies on how infrastructure (re-)shapes everyday urban life and daily experiences of the urban residents. In the eponymous book, he suggests considering infrastructure systems not as a part of urban technology but as a part of everyday urban life, thereby viewing the lives of urban residents as “infrastructural experience” *per se* (Graham, 2015).

Several chapters in this book discuss how human bodies and labor effectively operate as infrastructure in cities. Examples include Chapter 4 “*Waiting in the Ruins*” by Mariana Cavalcanti (2015), where the author examines how residents in Rio de Janeiro’s favelas, through their everyday practices and resilience, act as crucial elements of the city’s infrastructure. In Chapter 8 “*Cleaning Up the Streets*” Rob Shaw (2015) details how night-time neighborhood services teams (street-cleaners and litter collectors) in Newcastle-upon-Tyne function as “living infrastructure”, maintaining urban spaces through their labor.

This point broadens the understanding of urban infrastructure not only as physical objects in forms of buildings or services provided to the city dwellers, but as a diverse range of things “people, objects, animals, encounters, affects, laws, structures, emotions” that constitute urban infrastructure as such (Shaw, 2015). The critical role of humans in (urban) infrastructure will be also illustrated when I will analyze some of the interviews, where the residents of Kyiv emphasized the courage and indispensable efforts of emergency services in restoring targeted power grids to bring back light and electricity to the city — another example how humans are also a vital component of infrastructure (Graham, 2015).

This co-existence and interaction of humans and infrastructural technology, material and immaterial, organic and inorganic, highlights the hybrid nature of modern cities. This hybrid nature of urban life has been researched across urban studies, geography, sociology, environmental science, and STS. For example, in a study “*Cyborg Urbanization...*”, Matthew Gandy (2005) explores the concept of urbanization through the metaphor of the cyborg, blending organic and technological elements to describe modern cities’ evolving and complex nature. He dwells on the “**cyborg city**” as a conceptual framework that blends organic and technological elements to represent the complex interrelations within urban

environments. Cities, thus, are viewed as hybrid entities where the biological and the technological coexist and co-evolve (Gandy, 2015).

Erik Swyngedouw (1996; 2006) describes cyborg cities as a “particular socioenvironmental milieu that welds nature, society and the city together, often through many layers of networked technostuctures (like pipes, cables, relay stations, logistical apparatuses and the like) in a deeply heterogeneous, conflicting and often disturbing whole” (Swyngedouw, 1996 as mentioned in Swyngedouw, 2006, p. 105). Drawing upon the notions of “hybrids” and “cyborg” as borrowed from the works of Bruno Latour (1993; 2004) and Donna Haraway (1991), whereby if one views a cyborg as a fusion of technology and living organisms, urban infrastructures can be seen as interconnected “life support systems” (see Swyngedouw, 1996; Swyngedouw, 2006; Gandy, 2005; Gandy, 2002). For instance, the modern home functions as a complex framework or as Gandy (2005, p. 28) puts it, an “exoskeleton” for the human body, supplying necessities like water, heating, light, and other vital resources.

Swyngedouw (2006) further conceptualizes **urban metabolism** by defining cities as metabolic systems, where natural and social processes are integrated, and resources such as water, energy, and waste circulate through urban environments, (re-)shaping their form and function. Graham (2010, p. 2) calls it a “process of a city life” which is performed on multiple levels – “from the level of the human body and its metabolism—through which the food, water, and energy brought to the city through infrastructural circulation actually flow—through the city, region, and nation to the transnational and even planetary”.

What makes this urban metabolism framework particularly interesting for this case-study, is the way Swyngedouw (2006, p. 105) describes the vibrant exchange of sensory and material experiences within urban spaces, whereby scents, flavors, objects, and even human bodies—are constantly moving through the city. These elements are not just passively present; they are actively consumed, visualized, and narrated, as they become part of the city’s dynamic and diverse culture (Swyngedouw, 2006). Gatzweiler and Ronzani (2019) also mention the role of infrastructures and artifacts in collective sensemaking in times of large-scale humanitarian crises in urban areas. I will come back to this point later, when discussing how the Kyiv residents narrate about the rumbling sound from the working generators becoming a background and a symbol of urban resilience of the blacked-out city life.

As argued, traditional boundaries between nature and technology are no longer clear-cut in urban spaces (Gandy, 2005). In a contemporary (cyborg) city, people and machines, natural elements, and built infrastructures all blend together, creating a hybrid environment. Gandy (2005) also delves into the

inherent complexities and “monstrosities” of contemporary cities, suggesting that urban spaces can be seen as monstrous due to their vast, often uncontrollable, and unpredictable nature.

Cyborg city is thus a powerful framework and an epistemological tool for understanding the intertwined nature of modern urban life, where technology, nature, and human agency are in constant interaction. By viewing cities as cyborgs, urban spaces can be understood as hybrid entities, blending the organic with the artificial. These dynamics shape the experiences of those who inhabit urban spaces. As I move forward, this perspective will serve as one of the lenses through which I will explore resilience and adaptation strategies of urban populations when infrastructures fail in urban environments.

2.2. Vulnerabilities of Socio-Technical Systems

Like any socio-technical system, the city and its residents are deeply interwoven, continuously shaping and being reshaped by the technological, social, and environmental networks that sustain urban life. However, this interdependence also introduces significant **vulnerabilities** (again, I am using the term *vulnerability* in plural, because of multiplicity of vulnerabilities existing), as disruptions to any part of the system—whether through technological failure, natural disasters, or social upheaval—can have cascading “domino” effects throughout the urban environment.

In social science research, in particular, in science and technology studies, “vulnerability” of modern technological cultures (Bijker et al., 2014) has been studied in many forms and contexts. Its understanding varies in terms of what kind(-s) of vulnerability and in what context we are looking at. Bijker et al. (2014, p. 6) study on “Vulnerability in Technological Cultures” is one of the classic readings for understanding how vulnerability is embedded in everyday lives of both human and non-human agents. After all, vulnerability is an “emergent property” of any system – be it human body or power plant (Bijker et al., 2014). Like all other big and small socio-technical systems, infrastructures are not an exception. They are inherently vulnerable, but their vulnerability is also relational in terms of the context. The degree of vulnerability depends heavily on the system’s environment (Bijker et al., 2014).

Farrell et al. (2004) also denote vulnerability as a distinct feature of different elements of infrastructures. It is important to mention that there are many kinds of vulnerability in scholar studies - livelihood vulnerability, technological vulnerability, socioeconomic vulnerability etc. For that reason it makes sense to acknowledge the multiplicity of vulnerabilities of socio-technical systems, rather than to simply refer to the concept of vulnerability as an all-encompassing term (Bijker et al., 2014).

Notwithstanding the multiplicity of definitions of vulnerability and the different meanings various contemporary societies attribute to understanding the term, there is hardly any formal or clear-cut definition of the concept. In a study on vulnerability in terms of environmental and social changes, Neil Adger (2006), human geography scholar, defines it as the “states of susceptibility to harm, powerlessness, and marginality of both physical and social systems, and for guiding normative analysis of actions to enhance well-being through reduction of risk” (Adger, 2006, p. 268). In social energy research, Edgard Gnansounou (2008, p. 3735) as “the degree to which a system is unable to cope with selected adverse events”. In medical studies, particularly, in nursing, Kristine L. Florczak (2021, p. 12) describes vulnerability as a “harm from some future event that may impact a system adversely”.

Overall, the definitions are united by some keywords, like, unpredictability, uncertainty, hazard, harm, and risk and bear mostly negative connotations (Bijker et al., 2014). However, the interpretation of the concept has been transformed throughout its ever increasing application in academia circles. As a notion, vulnerability in social sciences studies and engineering cultures has gradually evolved into the notion with potentially positive meaning – after all, vulnerabilities can and often do create a space or a path for learning and adaptation for society, whereby by overcoming the vulnerabilities, its members become more adaptive and flexible, and their resilience emerges not at least through innovative and creative solutions (Bijker et al., 2014).

From a socio-constructivist perspective, Bijker et al. (2014, p. 14) also assert that vulnerability is not “an inherent property of an individual or a group, rather it is socially constructed and political in nature”. That the degree of vulnerability and multiplicity thereof is highly dependent on the outer context has been discussed earlier. They also provide a clear example how it works in the urban environments, which is also relevant for my case study: residents of cities, which are more vulnerable to and that frequently experience power outages have likely adapted better to these disruptions, making them more likely resilient during major blackouts; in contrast, cities less vulnerable to power outages are less accustomed to power failures and might be more affected by a significant blackout (Bijker et al., 2014, p. 1-2).

Similarly, talking about vulnerabilities of socio-technical systems in urban areas, where mostly large-scale infrastructures operate to ensure the needs of the entire city are fulfilled, there is a need to recognize a higher level of vulnerabilities the urban residents and the infrastructure systems are exposed to. If, for instance, large-scale infrastructures fail, there will be likewise large-scale impacts for the urban residents. Asymmetric levels of development of some parts of the city can only exacerbate **inequalities in vulnerability** exposure (International Committee of the Red Cross, 2015).

Also, one of the weak spots of vulnerability as an analytical tool is **metrics**, or, to put it simpler, how to measure vulnerability (Adger, 2006; Grimm et al., 2012; Bijker et al., 2014)? That is usually the point when the **risk** vocabulary comes to the stage. Vulnerability versus Risk – that is a dichotomy and there is a question of difference, which also appears as a point of discussion in the literature strand. Even though we cannot provide a unified and a clear-cut definition of vulnerability, we can clearly differentiate between vulnerability and risk, for being vulnerable is not merely being at risk (Florczak, 2021). Recent attention to vulnerability metrics has come to a more or less common ground that risk vocabulary and measurements are more quantitative, whereas vulnerability vocabulary is characterized as a more qualitative, contextual, relational, emotional and human-oriented approach. Not to mention that the risk-based approach has been criticized as “too limited in scope and explanatory power” (Bijker et al., 2014).

If this work was written thirty years ago, I would also dwell on the concept of “**risk society**” (Beck, 1992) that was quite a popular academic strand in social sciences in the 1990s. However, in the recent decade there has been a tendency in the (STS) academic circles to avoid using the notion of “risk society”, due to life getting generally riskier in many modern societies across the world (Matthewman, 2014), the term thus being self-repetitive in a way.

With this in mind, I deliberately chose to adopt the analytical lens of vulnerability in this case-study instead of risk and the concepts related to it. Vulnerability is particularly relevant for understanding how urban communities and infrastructure systems respond to various challenges, with the emphasis on human agency and resilience. In this way, I would simply go beyond “calculating” risks and would rather explore how people and systems adapt to and mitigate vulnerabilities as well as overcome socio-technical disasters.

2.2.1. Technological Disasters and Their Effects

Closely related to vulnerability are the concepts of **disaster** and **preparedness**. In social studies of science and technology, in particular in engineering studies, there is much literature focusing on the origins or genesis of disaster, however in the last decades there has been a growing interest towards the effects of such disaster, with the notions of vulnerability (as explained in the previous sub-section) and preparedness (Tironi et al., 2014) coming to the stage. Generally, there is much intersection and interdisciplinary studies on vulnerability, disaster resilience and preparedness in disaster studies, political sociology etc., with these concepts being highly interdisciplinary, and in STS there are many connections between these terms. As much as there is interest in the disasters in STS and sociology of disasters, there

is much interest into how to mitigate risks of the disaster and there is much focus shifted onto **disaster relief** (Matthewman, 2014).

Like with any academic concept, there is no unified or a clear-cut definition of disaster as a concept, the interpretation being heavily dependent on the field of studies and the context the disaster(s) is analyzed. In one of the classical studies on disasters in science and technology studies, Fortun et al. (2016) defines disasters as “failures of diverse, nested systems, producing injurious outcomes that cannot be straightforwardly confined in time or space, nor adequately addressed with standard operating procedures and established modes of thought”. Citing Quarantelli (2000, p. 682), Cope et al. (2020) conceptualize disasters as “the routines of collective social units are seriously disrupted and when unplanned courses of action have to be undertaken to cope with the crisis” (Quarantelli, 2000 as cited in Cope et al., 2020).

Stephen Hilgartner (2007) explores the role of disasters in contemporary technological cultures, in particular his empirical case analyzes the case of the natural disaster of Hurricane Katrina (2005), in the U.S. Hilgartner (2007) lists seven points, or statements, related to how disasters are interpreted from a socio-technical perspective. Particularly relevant points are as follows:

- Visually functioning technological systems are crucial for performance of everyday lives and socio-political order. They (re-)establish legitimacy of these political orders (Hilgartner, 2007, p. 154).
- There are no purely “natural” disasters, because all disasters inevitably include human agency, decisions made by humans, (monitoring) organizations etc.
- “Disasters and accidents create profoundly disturbing collective experiences that challenge the managerial vision of orderly systems” (Hilgartner, 2007, p. 154).

Of particular interest is the strand of social science literature, which focuses on **normalizing disasters** and whereby the scholars treat them rather as normal then abnormal accidents. “*Normal Accidents*” by Charles Perrow (1984) is one of the classical readings on that. As for Perrow (1984), in modern advanced technological societies, accidents are not abnormal events but rather typical results of the inherent design of technological systems. Thus, technological systems – be it a nuclear power plant (NPP) or a thermal power station – are never fully safe and there is always space left for the “normal accident” to happen (Perrow, 1984). This narrative has been also reiterated by Hilgartner (2007), whereby referring to Perrow (1984) and Jasanoff (1994), he suggests to look at disasters as “normal occurrences

that stem from the particular vulnerabilities that social institutions and actions build into the heterogeneous networks of technological systems and infrastructures” (Perrow, 1984 and Jasanoff, 1994, as mentioned in Hilgartner, 2007, p. 153).

Some other angles of literature on disasters include questioning how disaster is framed in societal imaginary and how people narrate about it (?), who has to hold the moral responsibility for the disaster (?), how societies recover from and prepare for (future) disasters, and what (imagined) relationships between society and technology influence this preparedness (?) (Hilgartner, 2007; Tironi et al., 2014). The concern of **blame** (especially when the disasters are purely technological, “man-made”, and not regarded as an “an act of God”) and the concern of **trust** (as authorities are often to blame for the technological disasters or less trusted by the society in the aftermath of the disaster) also matter (Cope et al., 2020).

The cases of disasters, both purely “natural” and technological), their effects and how societies respond to them, has been an object of interest of social scientists for many decades. Of particular relevance for this research, are the long-lasting effects and societal responses to the (nature-)technological disasters, which include the studies on industrial accidents, e.g. Bhopal gas tragedy (1984, India) (as studied by Bijker et al., 2014), three worst NPPs accidents – Three Mile Island Accident (1979, U.S.) (as studied by Perrow, 1984; Bijker et al., 2014; Oe et al., 2021), Chernobyl NPP Accident (1986, former Ukrainian Republic of the USSR) (as studied by Schmid, 2015), Fukushima Daiichi NPP Accident (2011, Japan) (as studied by Longmuir et al., 2021) – Deepwater Horizon oil spill disaster (2010) (as studied by Mayer et al., 2015; Cope et al., 2020), or a port explosion in Beirut (2020, Lebanon) (as studied by Nassar & Nastacă, 2020).

For instance, in “*Producing Power*”, Sonja Schmid (2015) explores the development and complexities of the Soviet nuclear industry prior to the Chernobyl disaster. One of the main arguments in the book is that technological (man-made) disasters always involve human agency, technologies, and organizational structures. Oe et al. (2021) dwell on the mental health consequences of those who experienced three worst NPPs accidents in history, revealing that these events significantly increased rates of psychological distress, anxiety, depression, and post-traumatic stress among affected populations.

Examining the long-lasting effects of the Fukushima NPP accident, Longmuir et al. (2021) mentions the increased rates of mental health disorders, social stigma, and community disruption. In addition, lower trust in the Japanese government in the aftermath of the accident is mentioned, whereby mass media were rated as more reliable sources of information compared to the government official sources. This effect highlights the differences in societies responses to and perception of purely “natural”

and technological (human-made) disasters. In the latter, there is always the persistent question of “who is to be blamed for what has happened?”

The case of the Deepwater Horizon oil spill disaster is also interesting in terms of studying community responses. Cope et al. (2020) explore community responses to the event, discussing the issues of blame, community sentiments following technological disaster and how these dynamically change over time. The term community is mentioned as being often idealized and reflecting a “wishful thinking”, because the concept *per se* has more often a positive connotation and associates with the image of a ‘warm’ place with the inherent feeling of belonging shared among its members (Cope et al., 2020, p. 125).

Disasters, thus, can be viewed as systemic processes “that permeate community social structure, producing social responses that are both emergent and constraining” (Picou et al., 2004, p. 1495; as mentioned in Cope et al., 2020, p.125). It means that in the aftermath of the disasters, community responses are not always about a sudden and long-lasting social cohesion in the face of the difficult situation faced by the community members – and I will refer to this idea in discussing the “moment of unity” the urban residents reported the temporality of community initiatives and (in-)formal support systems during the blackouts.

Likewise, Mayer et al. (2015) examine how social inequalities and comparisons influenced the social dynamics of the community affected by the Deepwater Horizon oil spill – the negative social impacts of perceived unfairness by the local community in disaster response and compensation processes diminished the community cohesion and trust. Instead of fostering community solidarity like in case of purely “natural” disasters, technological disasters such as oil spills (or infrastructure failures) tend to fracture communities and result in a collective trauma. This happens also because “man-made” technological disasters undermine trust in the institutions meant to protect against such failures (Mayer et al., 2015, p. 371-372).

Disasters, however, do not only challenge communities — they also reveal weaknesses in the systems these communities rely on on a daily basis. When infrastructure fails as a result of either internal or external factors, the lasting effects affect the lives of the community members, making adaptation and recovery challenging processes.

2.2.2. When Critical Infrastructure Fails: Targeted Breakdowns

Humans depend on infrastructure for almost every aspect of daily life—from eating and washing to staying warm, cooking, moving around, and staying connected. Infrastructure is, thus, vital as it provides essential services like shelter, energy, water, and the means to fulfill purely basic human needs (Graham, 2020) — as also reflected in Maslow’s pyramid of hierarchy of human needs.

By **critical infrastructures** we can understand “essential systems, assets, and networks” that are crucial for a country’s national security, economy, morale, public health, and safety. Among the vital components of urban facilities are power supply (light and electricity), connection network services, access to drinking water, finance and banking services (Bernardes, 2013). Likewise, when discussing the infrastructures breakdowns in urban context, I mostly refer to the failures of the systems, which are of vital importance for sustaining the basic needs of the residents in urban environments.

When these systems are disrupted or completely failed, it is also an extreme event, a kind of an (urban) disaster. When a power outage occurs, for example, in hospital settings, that may literally “kill”, as Granholm et al. (2023) highlight in their article on how power outages can critically impact health services by disrupting essential medical equipment.

Through such failures, infrastructures eventually become visible, although not within “the best” circumstances. As Henke and Sims (2020, p. 1-2) put it: “The mundane, functional aspects of infrastructure tend to come to the surface when something has gone wrong: the reliability of the electrical grid might become a major topic of interest after a power outage; the locations of mobile phone towers might come to mind when cellular signal is lost”.

In “*Disrupted Cities...*”, Stephen Graham (2010) notes that in the twenty-first century, disrupted urban environments have become a common part of global life. He also continues that the failure of infrastructure to operate in a normal way can “excavate the politics of urban life, technology, or infrastructure in ways that are rarely possible when such systems are functioning normally” (Graham, 2010, p. 3).

Sometimes, however, infrastructure disruptions occur not just due to technical failures or operational issues—they can also be the result of political conflicts and military actions, especially when infrastructure is deliberately targeted. Graham (2010) provides some notable examples thereof, including the 9/11 attacks in New York and the deliberate destruction of infrastructure in urban areas of Iraq and the Occupied Territories by U.S. and Israeli military forces. Much of the literature on targeted infrastructure

breakdowns focuses on infrastructures and their inoperability in unstable environments, in particular, in times of humanitarian crises – see, for example, Chapter 4 in Kornberger et al. (2019), with the research on the effects of infrastructures breakdowns conducted in one of the largest refugee camps in the Middle East.

Recent examples include academic studies on the humanitarian situation in Gaza and how civilian infrastructure in Gaza is also affected and targeted amidst the Israeli-Palestinian conflict (Shellah, 2023): “Much of what you will see around you—your home, your friends’ homes, your school—is ruined. Bombs are not your only enemy to survive. Fuel, clean water, food, and electricity are almost impossible to get”, as mentioned by Shellah (2023, p. 2072) when the author describes the sufferings of the ordinary people remaining in the city of Gaza and being deprived of basic infrastructural services (electricity facilities and water supply services) as a result of the ongoing military conflict. Tabor et al. (2023) also investigate how interruptions and damage to water supply infrastructure caused by warfare in northeast Syria contribute to the spread of waterborne communicable diseases.

The consequences and what is happening as a result of targeted damage of the electrical infrastructure in Ukraine has also become an object of energy studies and disaster risk management since 2022. Xu et al. (2024), for example, explore infrastructure damage and environmental changes caused by the Russian-Ukrainian conflict. In their article in *The Electricity Journal*, Sullivan and Kamensky (2024) detail the severe consequences of these attacks on the civilian population, including widespread power outages, disruption of essential services, and heightened humanitarian crises due to the loss of electricity in many localities in Ukraine – both urban and rural.

Zaniewicz (2023) discusses the impacts of infrastructure attacks on the lives of civilians in Ukraine and, in particular, provides some insights from his interview with a refugee woman, who after the situation in Kyiv got more or less stabilized around the end of summer of 2022 returned to the city and endured the blackout winter herself. What is particular about the study is the highlighted cascade effects of the infrastructure failure. Dwelling on the consequences of power outages in Kyiv, Zaniewicz (2023, p. 38-39) notes that the absence of electricity impacted more than just lighting – it has also led to the loss of cell phone and internet connection, as well as disrupted water supply as the systems normally rely on electric pumps. Likewise, heating systems were out of service as they required electricity to function (Zaniewicz, 2023).

Despite discussing the purely technological effects of the infrastructure failures, many academic studies often overlook the perspectives of those directly impacted by these disruptions, i.e. the questions

“where are the (ordinary) people?” and “how do they cope with and experience the consequences of these breakdowns?” are often left unattended. This gap albeit often leaves out a full picture of how these infrastructure breakdowns impact and (re-)shape the daily lives of those affected.

2.3. Urban Resilience and Its Narratives

When critical infrastructures fail, particularly in (conflict-affected) urban environments, urban dwellers often have no other choice but to adapt to the new reality and find a more or less rational, logical interpretation of the difficulties they have to face up with and endure. That is often the kick-off point where the process of **adaptation** and **normalization** takes place as a way of coping with the adverse events (such as infrastructure failures) on the emotional level. Through the process of adaptation – often by taking a proactive stance on finding alternative technological solutions to substitute for the loss of power – individual and collective forms of **resilience** emerge through adjusting the old routines. The story with a recurring theme of “collectively moving on” (Hilgartner, 2007, p. 155) becomes a common narrative for those who found themselves in an extremely visible vulnerable position. By resilience I imply the state of resilience of both humans and systems.

As discussed in the works by Carpenter et al. (2001), Folke et al. (2006) and Berkes et al. (2003), and summarized by Adger (2006, p. 268-269) resilience refers to the “magnitude of disturbance that can be absorbed before a system changes to a radically different state as well as the capacity to self-organize and the capacity for adaptation to emerging circumstances”. Rose and Liao (2005) consider resilience as the “ability to absorb some event that disrupts, adapt to such an event, and eventually to recover” (Rose and Liao, 2005 as cited in Florczak, 2021, p. 12).

Taking that conventional angle of understanding resilience in academic literature means understanding resilience mostly as an end-point product and as a positive construct of an attempt to “return to normal” rather than an inherent trait of humans and systems (see Cutter, 2018 and Cutter, 2021). In this way, resilience is interpreted as a result rather than a “process of building a capacity” to resist (Cutter, 2021). Susan L. Cutter (2021) states that resilience emphasizes proactive efforts of humans to build strength rather than focusing solely on minimizing vulnerability. In this sense, vulnerability and resilience are not mutually exclusive, as being resilient does not imply an absence of vulnerabilities (Cutter, 2018 as mentioned in Cutter, 2021).

It means that **enacting** resilience in real-life situations means proactively carrying out necessary actions (in the form of technological adaptations), thereby caring for emotional resilience during

challenging situations. In this way, resilience is a multifaceted term, involving more than just enduring or surviving; it is about taking steps to adapt, recover, and maintain some sense of normalcy despite adversity. Enacting it means not just bouncing back to the point where one was before, but requires the proactive use of experiences and knowledge to *repair the broken world(-s)*, leading not only to a return to normality, but eventually, a newer, stronger state of being.

In this sense, resilience is not just a passive trait but a result of coping tactics that the members of communities affected actively perform as a means of **em-powerment**—by making decisions, taking actions, changing the status quo and, finally, shifting the agency of power to overcome difficulties and restore stability in their lives.

Much of the studies on urban resilience are focused on disasters of natural origin (such as heatwaves, earthquakes, tsunamis, floodings, hurricanes, wildfires etc.) and are often related to climate change (Cutter, 2021). Studying urban resilience in the face of armed conflict and war is less common and present in the academic literature with only a few studies on urban reliance in the context of urban warfare and civilian impact – examples include the cases of the cities of Sarajevo, Baghdad, Aleppo.

The concept of **urban resilience** is also a well-studied token in academic literature – see, for instance the work of Wagenaar and Wilkinson (2013) on enacting resilience in the urban environments or the studies of resilience in the cities and resilient cities in the aftermath of disasters (Wallace & Wallace, 2008; Wamsler, 2008; Vallance, 2012). Generally, Cutter (2021, p. 201) describes the cities as “complex adaptive systems”.

Meerow et al. (2016, p. 39) define urban resilience as the “ability of an urban system—and all its constituent socio-ecological and socio-technical networks across temporal and spatial scales—to maintain or rapidly return to desired functions in the face of a disturbance, to adapt to change, and to quickly transform systems that limit current or future adaptive capacity.”

Leichenko and O’Brien (2011, p. 164) provide definition of urban resilience as the “ability of a city or urban system to withstand a wide array of shocks and stresses” (Leichenko and O’Brien, 2011, p. 164 as mentioned in Cutter, 2021). Likewise, Shaw et al. (2016, p. 5) conceptualize urban resilience as “the capacity of a city to bounce back effectively and quickly from the impacts of a disastrous event”.

Ribeiro and Pena (2019) also try to conceptualize urban resilience and provide more than 20 definitions of urban resilience from various scientific fields (engineering, social sciences, environmental sciences etc). They also define four basic pillars of urban resilience, which include “resisting, recovering,

adapting and transforming”. Urban resilience, as defined in Ribeiro and Pena (2019) means “extending the concept of resilience from technical systems to social systems, particularly to cities, and their ability to recover and continue to provide their main functions of life, commerce, industry, government, and social gathering in the face of calamities and other hazards”. Hamilton (2009) as mentioned in Ribeiro and Pena (2019, p. 3) provides a definition of urban reliance from engineering sciences as the “ability of individuals, communities, institutions, companies, and systems in a city to survive, adapt, and grow regardless of the type of chronic stress and acute shocks to which they are subject”.

Talking about collective resilience in urban areas, Cariolet et al. (2019) suggest to consider **community resilience** in urban environments similar to the concept of urban resilience. One of the key literature on that is the study of resilient cities by Vale and Campanella (2005, p. 55), where the authors discuss controversial consequences of terrorist attacks in Oklahoma City (1995) and 9/11 events in New York on community resilience, where the infamous events “brought communities together and at the same time tore them apart”.

In science and technology studies, we can look into (urban) resilience from the perspective of the questions “what does resilience mean and for whom?”, and whose resilience we are trying to conceptualize (see the study on the “*Politics of Relient Cities*” by Vale, 2014). For instance, Meerow and Newell (2019) define the five Ws (“whom, what, when, where, and why”) of urban resilience to analyze resilience as a social construct.

These questions are particularly relevant to ask (oneself) when exploring the **narratives** of urban resilience. For example, Borie et al. (2019) analyze narratives and strategies of urban resilience in cities of Manila, Cape Town and Nairobi, focusing on how these urban areas resist, recover, adapt, and transform in response to environmental challenges. Mapping these narratives, Borie et al. (2019, p. 205) emphasize that in order to “to understand what resilience does (how it is used, what it means to different actors)”, it is important to analyze individual and collective narratives as *knowledge-making practices*, in particular, look into what narratives as a “form of knowledge” are constructed, how and by whom.

Vale and Campanella (2005) state that throughout history, the cities have shown more resilience and recovery ability in the aftermath of disasters. In that regard, they provide extensive analysis of the narratives of resilience and generally the “narrative imaginary” in the context of the people of America conceiving of the disasters as the opportunities for development and the “instruments of progress”, providing historical examples of community recovery after the Chicago fire (1871) and San Francisco earthquake (1906) (Vale and Campanella, 2005, p. 28). They explore the narratives of resilience in

contemporary times, where the stories of resilience have been collectively used to “domesticate disasters”, retelling which, the communities affected could construct and articulate their emotions and experiences regarding disasters – making “sense of nonsense” by interpreting the adverse events (Vale and Campanella, 2005, p. 33).

In the Report by the International Committee of the Red Cross (ICRC) (2015), mentioned in the previous sections, urban areas are also characterized as having more potential for resilience and innovation. Since big urban spaces are generally well-networked globally (especially capitals serving as hubs for diplomatic embassies, international organizations and businesses etc.), they are often bearing more strategic importance for recovery plans and international humanitarian aid, thus, having generally more potential to receive the external assistance for resilience-building (ICRC, 2015).

There are also examples of resilience through **storytelling** not only in academic literature. In a novel “*The Cellist of Sarajevo*”, Steven Galloway (2009) follows the lives of ordinary people trying to survive in a besieged city Sarajevo in the 1990s Bosnian War, where infrastructure is destroyed and daily lives of the locals are disrupted by military actions. The recurring themes of resilience and hope run through the book. Aware that the next bullet could hit at any time, the characters in the novel maintain the “normality” of their lives by continuing doing their daily routines. The cellist’s act of playing music in a war-torn city is a good example of how examples of resilience can inspire and sustain communities facing challenges.

In the case study that follows, we will see similar stories emerge—stories narrated by ordinary people finding ways to adapt and repair their worlds turned upside down due to the power disruptions and blackouts. These narratives not only reveal the resilience the urban communities can develop “living off the grid” but also show how cities can sustain and recover after large-scale technological disruptions.

2.4. Conclusion

The literature that I have reviewed in the section, while not exhaustive, provides me with some key take-aways, which further lead to the relevancy of the case study of the thesis.

Infrastructure, as inherently material and a socially constructed phenomenon, becomes visible mainly when it fails, revealing its deep embeddedness in our daily lives. In turn, infrastructures also (de-)construct our identities and this co-dependent relationship is important to keep in mind (section 2.1.1).

I have also explored how these sociotechnical assemblages not only sustain communities but also render them vulnerable, a vulnerability that is likewise socially constructed (section 2.2.). The cases of the (targeted) infrastructure failures emphasize dependence of modern technological societies on availability and functionality of technology (section 2.2.1. and section 2.2.2.). Additionally, I examined the narratives of urban resilience (section 2.3.) — how they emerge, spread, and help communities make sense of the challenges they face by finding the most rational interpretations of the adverse events. In this research, resilience, as discussed in the literature, is considered an outcome, an end-product, a socially constructed phenomenon, not an inherent trait of society.

While much of the studies on urban resilience focuses on natural and nature-technological disasters, there is nevertheless a lack of research focusing on the anthropogenic components. Likewise, research of urban resilience in the context of war-affected localities is less common. However, recent global events call for attention — this case study is just one among many unfolding simultaneously, all demanding a notice. My focus on the resilience and coping strategies of the residents of Kyiv living through power outages and blackouts in urban areas, thus, not something I would call “filling a research gap”; rather, I would like to complement the existing studies by voicing some of many experiences often considered too localized and overlooked in broader academic discussions.

3. Research Questions

As mentioned earlier, the main objective of this study is to examine experiences of the people residing in Kyiv during the very first period of frequent power outages and large-scale prolonged blackouts during the winter of 2022-2023. These temporal and spatial dimensions are not arbitrary.

One of the important aspects of this research is to look at the very first experiences of coping with power outages at the period of time the challenge was completely sudden and an unfamiliar experience for the local population, because early responses and the first coping strategies might be most insightful for studying technological and emotional adaptability of communities affected by targeted infrastructural breakdowns.

The **main research question (MQ)** that guided me throughout this study is as follows:

How do the residents of Kyiv make sense of their experiences of power outages and blackouts and their ways of coping with it?

The focus of the main question lies in exploring multiple interpretations of experiences of the urban residents navigating their lives amidst power outages and blackouts in Kyiv. I put some keywords in this question, like “experiences”, “power outages” and “blackouts”, which require further explanation and concretization. By *experiences* I understand localized, unique, different ways of interpreting the saturated lived periods of time, which construct new forms of knowledge, (re-)shaping perceptions, and uncovering emotional landscapes previously unknown. The distinction between *power outage* and *blackout* in a way I interpret it in this study is that the first one refers to any loss of power, regardless of the scale or duration, including scheduled and unscheduled power cuts, while the second one refers to a large-scale, sudden, prolonged loss of power over a significant area (usually the whole city, not a single neighborhood). Altogether, the main research question of this study is focused on exploring the different experiences of living off the grid and multiple ways of coping with power outages and blackouts the local residents narrate during the first wave of targeted energy infrastructure breakdowns during the winter season of 2022-2023 in the city of Kyiv, Ukraine.

More detailed sub-questions that help to answer the MQ are as follows:

SQ1: What stories do the locals narrate about their experiences and how do they reflect on them?

Answering this subquestion will help me to see how the residents make sense of and narrate about their experiences not only in terms of the ways of coping with power cuts but also in terms of their own interpretation of these events in general, how they reflect on them (both verbally and non-verbally) through storytelling, and how these narrative sensemaking practices contribute to the formation of the situated knowledges as socially constructed (collective) knowledge frameworks of coping with power outages. I use *narrate* instead of tell or share because narrating is a part of a larger knowledge-making practice and is essentially a more detailed, logical and structured recounting of events in a storytelling manner. In this way, the residents not only reflect on their blackout survival experiences but also attribute the meanings to what they recall, self-evaluating their accounts and constructing the senses out of these stories.

SQ2: What coping strategies do the residents report when it comes to managing the challenges of power disruptions in everyday lives?

This question is crucial to understand not only practicalities of technological adaptation to the power outages in daily lives but also evolving emotional responses — gradual acceptance and normalization of living in unpredictable conditions — as coping strategies refer not only to technological workarounds but also to the ways of maintaining emotional well-being in the most possible way. In this case, being dis-empowered (both materially and emotionally) by disrupted infrastructure systems and larger existing war-time context, the residents can literally self-empower themselves by resorting to alternative technological solutions to navigate power cuts and blackouts. In turn, successful technological adaptations might be crucial for restoration of emotional well-being. Narrating about and reflecting on these experiences can also be regarded as a coping strategy *per se*.

SQ3: How is (urban) resilience enacted on both individual and collective levels in response to these challenges?

Overcoming challenging circumstances, individuals, communities and systems demonstrate their ability to to recover, adapt, and withstand in the face of extremely vulnerable conditions for the urban dwellers, who are dependent on the centralized electricity and water supplies to meet their basic needs. This can be considered as a good point to examine resilience emerging in the society as an outcome of proactively resisting to and bouncing back the difficulties both technologically and emotionally.

Enacting resilience is, in this way, not only about having the capacity to be resilient to the vulnerabilities. By answering this question I want to look at how resilience as a capacity to overcome

challenging situations and maintain functionality despite technological disruptions brings about new knowledge and skills, which open new horizons of human resilience on both individual and larger societal levels. I am also interested in concrete coping mechanisms and initiatives applied on a communal level to navigate power outages and blackouts in a larger context of warfare uncertainty.

4. Theory and Sensitizing Concepts

To respond to these questions I will use some analytical lenses from organizational studies and social studies of science and technologies. I will first discuss *sensemaking theory* and how it can be applied to analyze the ways the narratives of urban resilience emerge and circulate. Then, I will dwell on feminist language of *situated knowledges*, and discuss how localized knowledge frameworks contribute to creativity and resourcefulness. I will finally resort to postcolonial feminist studies in STS to discuss how *tinkering* and other local technological makeshift solutions can be analyzed as a means of caring using the concept of *matters of care*.

4.1. Sensemaking: Making Sense of Experiences

“What is the story?” or “Now what?” are some of many questions circulating around the communities when an unpredictable and before unknown experience occurs and the collective knowledge-making practice tries to interpret and construct the most possible “logical” sense (read: understanding) out of abnormal events (Weick, 2005, p. 410; Christianson and Barton, 2020; Kudesia, 2017).

Sensemaking theory (also referred to as a conceptual lens or an approach) is an analytical framework that aims to engage with these social processes. It is a knowledge-making framework and a cognitive process that explores how individuals and groups interpret and “construct the meanings” of events and experiences, especially in situations of uncertainty or ambiguity (Weick, 1995; Brown et al., 2015). The theory has been developed by organizational theorist Karl Weick (1995) and is widely used in fields like organizational studies, communication, and psychology.

Sensemaking as defined by Maitlis and Christianson (2014, p. 57 as mentioned in Kornberger et al., 2019, p. 90), as “the processes through which people work to understand issues or events that are novel, ambiguous, confusing, or in some way violate expectations”. In this way, sensemaking implies both **interpretive** and **constitutive** cognitive processes (Kornberger et al., 2019, emphasis added). In a study “*Managing the Unexpected: Resilient Performance in an Age of Uncertainty*”, Weick and Sutcliffe

(2007, p. 67) highlight that the social construction of new meanings in unstable conditions demands the ability “to sense the unexpected in a stable manner and yet deal with the unexpected in a variable manner”.

Baber and McMaster (2016, p. 6) emphasize that the word “*making*” suggests that something is being constructed, potentially by piecing together information an individual gathers from their environment and combining it with their existing knowledge. In this regard, not only the social construction of the interpretation of the events occurs, but also the construction of the identity or the agency of a **sensemaker** (Kornberger et al., 2019): individuals’ and organizations’ identities shape their perceptions and interpretations, meaning sensemaking is closely tied to mental process through which individuals situate themselves in the world.

One of the key features of sensemaking theory, which Weick (2001) also emphasizes is **enactment** (also discussed by Langenberg and Wesseling, 2016). Weick uses the term “enactment” to highlight that “when people act, they bring events and structures into existence and set them into motion” (Weick 2001, p. 225). It means that in sensemaking, people do not just passively interpret the world; they actively co-construct it through their actions and decisions. Enactment, thus, means that how people act and the choices they make are influenced by the sense they make of their situations, which in turn affects future events and their interpretations. In this regard, sensemaking is not a one-time activity but an ongoing dynamically changing process. As new events unfold, individuals and groups continuously revise and update their interpretations.

Even though much of the literature on sensemaking focuses on sensemaking in organizational studies (see also Tan et al., 2020) and management theory, there are some empirical studies focused on the processes of sensemaking in unstable environments and crisis situations that trigger the search for explanations for events that progress in real-time. For instance, In “*Thinking Infrastructures*” Kornberger et al. (2019), apply sensemaking theory in discussing how infrastructures are (re-)imagined and (re-)interpreted in the times of large-scale humanitarian crises (see Kornberger et al., 2019, Chapter 4). Christianson and Barton (2020) discuss how people and organizations made sense of the rapidly changing and uncertain environments during the Covid-19 pandemic.

Several studies on sensemaking have found some important factors that help individuals “make sense” of challenging situations. Among all listed, effective community- (and in some cases team-) interactions (Weick & Roberts, 1993), and the capability to adapt and “reorient” when needed are mentioned.

Sensemaking involves interacting with others, sharing interpretations, and constructing collectively-shared knowledge patterns to understand certain events. This collaborative aspect is crucial because knowledge-making practices do not occur in isolation, as individuals often rely on and compare their individual perceptions against the broader collective knowledge frameworks, narratives and storytelling to interpret the meaning of complex situations they face up with (Bietti et al., 2019). On the other hand, Kornberger et al. (2019) have pointed out pitfalls that make sensemaking more difficult, such as slowly accepting and normalizing the abnormal events or adhering to the single existing collective knowledge structure or framework to interpret the events.

While sensemaking usually engages with **retrospective processes**, meaning that sensemaking often occurs after an event has taken place as individuals look back on their experiences and try to interpret or “make sense” of what has happened, a research area that has received less attention concerns with **prospective sensemaking** (Kornberger et al., 2019; Maitlis and Christianson, 2014). Prospective sensemaking refers to the process by which individuals or groups anticipate (Klein and Snowden, 2011) and plan for future events or conditions that are not yet fully defined. In this way we can understand that individuals and communities develop new insights and their own often “lay” and understanding about **potential future scenarios** or desired outcomes, even when these scenarios are vague, uncertain or hardly relate to the realities (Kornberger et al., 2019). This forward-looking knowledge-making approach is used in disaster preparedness by envisaging upcoming challenges and creating strategies based on anticipated thinking.

Sensemaking theory, particularly its retrospective side, offers a good lens to explore how resilience is enacted and how coping strategies are applied to interpret and construct meaning around experiences of power outages and blackouts in Ukraine. I will further explain how narrative interviews (Czarniawska, 2004) will be used to capture both retrospective and prospective sensemaking: looking back at how participants interpret the previously occurred power disruptions and how they share anticipations, expectations and *desired futures* regarding the blackouts-to-be.

Sensemaking provides a nice analytical lens to look into the knowledge-making processes of interpreting adverse events on both individual and collective levels. Ultimately, power outages in Kyiv are not isolated incidents experienced by residents alone; they are collective traumatizing disruptions affecting the entire community. Through narrative interviews, I explore how the locals engage in discussions with family, neighbors, and community members to construct the senses out of these events, interpret the logics of the power outages origins, evaluate and reflect on the effectiveness of various coping strategies. This theoretical approach will be also useful to look into how collective resilience and

the identity of a “resilient citizen” are socio-technical constructs, being the end-products of individual and collective adaptations in response to the power outages and blackouts.

4.2. Contextualizing Knowledge and Technologies: *Situated Knowledges*

Related to sensemaking theory is Donna Haraway’s (1988) concept of **situated knowledges**. Both emphasize that understanding and interpretation of events are influenced by context, but they focus on different aspects of this relationship. As per Haraway (1988, p. 579) situated knowledge produces “a more adequate, richer, better account of a world, in order to live in it well and in critical, reflexive relation to our own as well as others’ practices of domination and the unequal parts of privilege and oppression that make up all positions”. She further argues that objectivity is always embodied in *situated knowledges* and *local visions* as the dominant ways of how knowledge is generated (Haraway, 1988).

Donna Haraway’s concept of *situated knowledges* goes hand in hand with feminist theory and the general trends of postcolonial studies in social sciences and social studies of science and technology. Knowledge in her vision is inherently embodied in the context in which it is produced and is influenced by social, cultural, and techno-political factors. This implies that what is known and how it is understood varies depending on the knower’s position, experiences, and environment. She also notes that no single perspective can claim absolute “purely objective truth” and calls for the inclusion of all voices (Haraway, 1988). Different viewpoints contribute to a more comprehensive understanding of phenomena. This is crucial for studies like this that explore how different people experience and interpret the same events in the same spatio-temporal context.

Both sensemaking theory and situated knowledges stress the importance of **context** in shaping understanding. In sensemaking, people (in this way referred to as sensemakers) interpret events like power outages based on their specific experiences and geographical settings. Similarly, Haraway’s (1988) concept of *situated knowledges* highlights that social knowledge and interpretations are shaped by the contexts in which they arise.

Haraway (1988) emphasizes the importance of recognizing the physical and social **embodiment** of knowledge – she calls it “embodied nature of all vision” (p. 581) in the form of **agency**. She writes: “situated knowledges require that the object of knowledge [in this case, the residents coping with power outages in Kyiv] be pictured as an actor and *agent*, not as a screen, or a ground, or a resource, never finally as a slave to the master (...)” (Haraway, 1988, p. 592). They should not be reduced to mere effects

of external forces [such as infrastructural failures or political actions], nor be seen as passive recipients of “objective” knowledge imposed by external authorities. Instead, they are recognized as active subjects (agents) in the interpretation of their own experiences and creating their own ways of adapting to the new realities, re-constructing the local knowledges.

In the previous sub-section, I have also emphasized the focus on **dynamics** and continuously adapting interpretations based on new information and experiences, which is also mirrored in Haraway’s (1988) emphasis on the **evolving nature of knowledge**. Just like in my case, as the residents of Kyiv experience more power outages, their sensemaking process evolves, and their “situated knowledges” about these disruptions are constantly modified in a dynamical manner.

Building on the concept of situated knowledges, it is crucial to understand how these contexts also shape the application and adaptation of technologies in daily lives. Just as from feminist perspective, knowledge is not universal but situated, so too are the ways in which technologies are deployed, interpreted, and their usage is modified by different communities. In this regard, technologies are not merely tools or solutions imposed “from the outside” but are deeply embedded within the social, cultural, and environmental fabric of the communities that use them. Like in feminist understanding of *situated knowledges*, this contrasts with the notion of “objective”, universal knowledge of how technologies are supposed to be used that often exists independently of social, techno-political, and cultural contexts.

This is particularly evident in the study of “*The Zimbabwe Bush Pump ...*” by Marianne de Laet and Annemarie Mol (2000), where the technology is not just a mechanical device but a dynamic and fluid entity that adapts to and evolves with the needs and conditions of the local context. The pump is not just a piece of universal technology that functions the same everywhere; instead, its success and adaptability depend on its integration into the local practices, needs, and experiences of the communities that use it.

The idea that technology is “fluid” (Laet and Mol, 2000) and changes based on its context aligns with Haraway’s understanding that knowledges—and by extension, technologies and their application—are always situated. The Bush Pump, just like a portable power station for camping, has no fixed identity or a universal function; its usage is shaped by the local conditions, and in turn, its localized application shapes the community. This interdependency between the pump and its context exemplifies how situated knowledge operates in practice – the use of technologies is socially constructed and is based on specific, lived realities rather than abstract, universal principles.

Similarly, in the context of using alternative and repurposing old technology to cope with blackouts in the urban environments, the diverse and creative ways in which the residents of Kyiv have adapted and repurposed technologies like portable lamps, camping stoves, power banks and generators to navigate power outages illustrate how contextualized the use of technology is [SQ2]. Here, technology becomes a part of the community's resilience, shaped by local knowledge, and the specific challenges they face [SQ3]. The residents have often adjusted the existing technologies and used makeshift solutions, often relying on creativity and imagination to meet their "technological" needs with limited resources at hand.

4.3. Tinkering, Bricolage and Jugaad

A small story here to begin with: When I was a child, my grandmother used to repeat the phrase "make a porridge from an ax". It comes from the Eastern European folktale of the same name that highlights the power of creativity and the ability to make something out of nothing in tough situations. The story is similar to the folktale about the "Stone Soup," and appears in different cultures with various objects, like an ax, playing a central role. In the 'porridge from an ax' version, a hungry traveler arrives in a village and asks the locals for something to eat, but they are unwilling or unable to share and refuse. The traveler then claims that he can only make porridge with an ax. The villagers watch intrigued as the traveler places the ax in a pot of boiling water. As the water heats up, the traveler suggests that a little salt, some grains or some meat would improve the porridge. One by one, the villagers contribute what they have and together they create a meal that everyone enjoys. The moral of the story is often about the power of ingenuity, creativity, mutual support, and how resourcefulness can turn seemingly impossible situations into positive outcomes.

Just as in the old fairy tale for children, in challenging times of coping with difficulties and adapting to uncertainties, individuals and communities improvise and make their own "*porridge from an ax*" – ingredients, spices and the ultimate flavor always depend on the localized context and needs. This process of adaptation, often characterized by improvisation, resourcefulness, and creative problem-solving, resonates with the concepts of **tinkering** and **bricolage** (Ciborra, 1992; Bijker et al., 2014; Kuper et al., 2017). Both are common in fields like engineering, where solutions often emerge through hands-on experimentation and creative use of materials. In daily life, however, both tinkering and bricolage can be seen when people fix things around the house, repurpose items, or come up with solutions to everyday problems.

Tinkering is the process of experimentation, adjusting, and modifying something to improve it or make it work, often through trial and error; trying out different solutions until something clicks. Tinkering is often informal and improvisational, relying on curiosity, experimentation, and an iterative approach (Elmqvist et al., 2018). In a study on tinkering and DIY³ culture in Australia, Wilson (2017, p. 5) defines tinkering in the following way: “(...) it [tinkering] can be practical and utilitarian, a form of economic production, but also a form of scholarship, play, adventure, resourcefulness and resilience. It can be a portal to social connection, community, spirituality, sanctuary, thrift, identity and political resistance”.

Elmqvist et al. (2018) define key features of tinkering, including playful experimentation, local action (bottom-up approach), shifting the function and repurposing (re-design) of the materials and devices available. Mirroring Haraway’s (1988) *situated knowledges* and Laet and Mol’s (2000) story about Zimbabwe Bush Pump, in tinkering, the same element takes on different functions in different localities or contexts — “tinkering approaches can generate inspiration and new ways of thinking” (Elmqvist et al., 2018, p. 1554).

In the context of my study, tinkering represents the way urban dwellers of Kyiv creatively and resourcefully modified and repurposed the existing technologies to cope with power outages, using modified old camping stoves for cooking or repurposing old batteries from vehicles or other large devices to create homemade lighting systems by connecting these batteries to LED lights or small lamps.

While tinkering is more about experimenting with and refining existing systems or materials, **bricolage** focuses on creating or constructing something new from what’s available, often repurposing materials in innovative ways. In the work “*The Savage Mind*” French anthropologist Claude Lévi-Strauss (1962), introduces the identity of the **bricoleur** as someone who creates or invents from a limited range of available materials and tools to achieve a desired outcome. *Bricolage* comes from the French word for “handyman” or “DIY” and refers to the art of making do with what is at hand. It involves creating or repairing something using available materials, often in a way that was not originally intended. Sometimes, however, bricolage is not about making something new out of existing parts – just like the residents of Kyiv creatively repurposed old technologies and used materials and knowledge at hand to create practical solutions to navigate power outages.

In the above mentioned study on tinkering and DIY culture in Australia, Wilson (2017) mentions the work of a French social scientist Michel de Certeau (1988, p. 111), where the latter theorized “bricoleur” as a tinkerer, who “uses tactics, rather than strategy, to make do in everyday life”. Certeau

³ Do-It-Yourself

(1988) explains that *strategy*, especially in military theory, involves control, management, and expecting predictable outcomes by those in charge, whereas *tactics* are about dealing with the immediate situation and are often used by those without power—they involve adapting and improvising on the spot. Thus, bricolage, or “making do,” is more flexible than strategy and can be easily adjusted to fit whatever situation may come.

Related to tinkering and bricolage, is the concept of *jugaad*, a term originating from Hindi, embodies a creative and ingenious approach to solving problems through improvisation and utilizing available resources effectively. It can be literally translated from Hindi as “an innovative fix; an improvised solution born from ingenuity and cleverness” (Radjou et al., 2012, p. 4). It is a method of creative problem-solving where everyday items are repurposed to serve new functions. For example, empty beverage bottles might be used as makeshift storage for dry goods, or a diesel engine could be attached to a simple cart to create a basic vehicle. This approach reflects how people in India use their ingenuity to make the most of the resources they have. (Radjou & Prabhu, 2015). *Jugaad* also aligns closely with the context of my study, capturing the inventiveness and adaptability of the urban residents as they face the dilemmas caused by unpredictable power availability.

Altogether, all three concepts of tinkering, bricolage and jugaad are helpful analytical lenses to study coping mechanisms of technological adaptations amidst power outages and blackouts [SQ2]. The stories of successful improvisations (in this case technological adaptations) and the know-hows how to make do with the resources available spread in the community contributing to both individual and collective resilience to the loss of power [SQ3].

4.4. Caring by Improvising

By improvising, tinkers and bricoleurs not only restore electricity at their homes and maintain their daily routines, but also care for themselves (and also for those who they care for). And these doings and labor of care are not random. Because everything that we do is related to *care* in this or another way.

Matters of Care, as an analytical concept, is well-known in social sciences, social studies of science and technologies, and healthcare. Coined by María Puig de la Bellacasa (2011), a feminist scholar of science and technology studies, the concept of “matters of care” was developed on the basis of Bruno Latour’s (2004) “matters of concern”. In the article published in the journal “*Social Studies of Science*”, Puig de la Bellacasa builds on Bruno Latour’s concept of “matters of concern,” which emphasizes the importance of understanding the social and ethical-political dimensions in Science and Technology

Studies (STS) narratives. Latour argues that everything is composed of “matters of fact,” and that these facts, once stabilized, become “concerns”. Puig de la Bellacasa (2011) extends this idea by proposing that focusing on “matters of concern” naturally leads to an “ethos of care.” She continues that this “ethos” introduces a critical perspective that is absent in Latour’s framework. To address this gap, she suggests rethinking “matters of concern” as “matters of care” (Puig de la Bellacasa, 2011, p. 85).

The definition of *care* is borrowed from Joan Tronto and Berenice Fisher (1990) as “everything that we do to maintain, continue and repair our world so that we can live in it as well as possible. That world includes our bodies, ourselves, and our environment, all that we seek to interweave in a complex, life sustaining web” (Fisher and Tronto, 1990 as mentioned in Puig de la Bellacasa, 2011, p. 93). Puig de la Bellacasa also draws on Haraway’s (1988) concept of *situated knowledges*, claiming that knowledge cannot be separated from the web of relationships that shape the worlds we live in. She argues that thinking and knowing are deeply intertwined with these relationships, and as such, they inherently involve care, further noting: “relations of thinking and knowing require care and affect how we care” (Puig de la Bellacasa, 2017, p. 69).

Care is thus highlighted as a diverse set of actions [like bricolage and tinkering with technical appliances, e.g. converting petrol generators to gas, repurposing everyday objects, and developing DIY solutions] necessary for maintaining and nurturing the complexities of life [such as dealing with power outages], emphasizing that human agency [in this case, urban residents as agents, sensemakers, and carers] is deeply embedded within a world of interdependent forms and processes (Puig de la Bellacasa, 2017, p. 70).

Technology is in this way a *matter of care* and a *caring matter* as well. In Annemarie Mol’s et al. (2015) study on “...*Tinkering in Clinics, Homes and Farms*”, caring practices and technologies are closely intertwined. Mol et al. (2015) mention how technologies in the care sector appear to be incredibly adaptable. Tinkering, thus, as a form of *caring labor* involves adaptation of technologies, the bodies, the people, and the daily lives involved. They mention that throughout the twentieth century, care and technology were often viewed as opposites — care was associated with “warmth and love”, while technology was seen as “cold and rational” (Mol et al., 2015, p. 14). Where care has been seen as something that could not be easily measured or calculated, technology has been focused on achieving specific outcomes.

However, this distinction got blurred over time, so in the context of my case, this distinction is likewise blurred. The ways in which the local residents of Kyiv adapt technologies through improvisation

during power outages—such as converting petrol-run generators to the gas ones or tinkering homemade heating systems to keep warm during cold nights—show how care and technology intersect. Here, technology becomes a means of care (Lindén & Lydahl, 2021), as the locals creatively use it to sustain their lives as close to the normal as possible. After all, doing *care* can organize and discipline bodies (Martin et al., 2015, p. 627) to move on even in the most challenging times.

“Everything we do to repair our world” – is another part of the definition of care mentioned earlier (Fisher and Tronto, 1990 as mentioned in Puig de la Bellacasa, 2011, p. 93). Indeed, the labor of **repair** is another form of care, because when something is broken, people usually try to fix it. While repairing traditionally refers to fixing broken objects, it also applies to restoring damaged aspects of life, such as “objects and structures; cities; countries; a person’s appearance or health; bodies and body parts; and immaterial things like friendships, honor, status, and finances” (Henke and Sims, 2020, p. 3). The process of repair thus can encompass both material and social restoration.

However, it also includes the “**darker sides**” (Martin et al., 2015; Lindén & Lydahl, 2021) of caring practices—where caring for others during challenging times can become an added moral burden. In crisis contexts, acts of care are often intensified by societal expectations and feelings of obligation, leaving individuals feeling stretched between their own needs and those of others. For residents experiencing power outages, caring extends beyond immediate family and might involve neighbors or even broader communities, which may trigger the feelings of responsibility and, at times, helplessness.

Nevertheless, care can be regarded as a form of resilience and resistance to the oppressing circumstances [SQ3]. Alternative technological solutions can perform caring functions in the absence of centralized power supply. In the case of coping with power outages, repairing things becomes a key way people enact care (step 1) and thereby resilience (step 2). Resilience in this way (both on individual and collective level) is impossible without caring practices. This includes fixing broken generators, repurposing household items, and creating makeshift solutions to meet immediate electricity needs. These doings of technological repairs are essential for repairing the “normalcy” of the daily livelihood in the communities affected. In this case technological fixups are crucial for repairing emotional well-being.

4.5. Conclusion

I have discussed different conceptual frameworks that can work as analytical lenses for my case study. Wrapping this section up, I briefly summarize what I take away from each of the concepts for my research. **Sensemaking** is crucial for exploring the individual and collective patterns of how the residents affected by the loss of power interpret and, consequently, respond to these technological disruptions (MQ and SQ1). **Situated knowledges** highlight how their responses are constructed and shaped by local context and experiences (SQ1). **Tinkering and bricolage** reveal the creative ways people repair and adapt technology with whatever knowledge and materials they have (MQ and SQ2). Using the feminist postcolonial language of **care** and **matters of care** invites me to look into how these technological and daily life adaptations can be regarded as a vital social component, without which resilience as an end-product could not be possible (SQ3). Together, these conceptual frameworks complement each other and will help me address research questions of this study.

5. Methodology

To explore the experiences and local expertise in coping with power outages and blackouts, and to understand the sensemaking practices behind these experiences, this study employed **qualitative research methods**. The primary approach was **narrative interviews**, which were complemented by an **auto-ethnographic study** during the fieldwork.

5.1. Research in Context: Spatial and Temporal Dimensions

From the very beginning of the study, it was important to acknowledge that the stories and experiences I explore do not exist in just one place. Rather than generalizing the stories to a single point on a map, I treated various sites as integral to my research, because each of them offered a distinct perspective on the narratives of resilience I explored. For that reason, a multi-sited fieldwork approach was adopted (Falzon, 2009; Coleman, 2013). In this way, it included both the physical locations where fieldwork occurred and the spaces of narrative production during interviews.

Kyiv, the largest urban area in Ukraine, was chosen as the main research site due to the rapidly evolving nature of power outages and blackouts in the city. The shifting power supply situation required quick adaptation from residents, who had to respond to these new, unpredictable, and challenging conditions.

Other reasons to localize this study in Kyiv included:

- *Contextual Relevance*: Since October 2022, the city has faced significant disruptions to its electricity infrastructure, making it an ideal location to study urban resilience and coping mechanisms in response to infrastructure failures.
- *(Relative) Safety*: As the capital, Kyiv hosts government agencies, large international organizations, and embassies. Its strategic importance has resulted in more robust air-defense systems compared to other major cities in Ukraine, offering a relatively safer environment for fieldwork.
- *Practical Considerations*: as my home city, Kyiv provided practical advantages, such as access to accommodation for an extended research stay.

Fieldwork was conducted in almost three weeks in July 2023, with the goal of exploring the coping strategies of urban residents in Kyiv during the power outages that occurred between October 2022 and February 2023. The decision to conduct interviews in this temporal dimension was driven by practical considerations. Firstly, the summer holidays made it easier for me to travel. Secondly, although the interviews took place several months after the initial power outages, this timing allowed participants to offer reflective insights into their first experiences of managing prolonged blackouts, even as the power cuts had temporarily ceased by summer 2023. In addition to these retrospective reflections, participants also shared prospective insights of their preparedness for the anticipated electricity infrastructure breakdowns in Kyiv.

5.2. In the Field: Autoethnographic Reflections

A part of the methodology involved immersing myself directly into the environments where the narratives unfolded. The auto-ethnographic component of this study required active participation and reflection within the field. This approach was crucial to my positioning within these diverse research sites, not merely as an observer, but as an engaged participant. As Law (2000, p. 7) notes in reference to **“self-reflexive” ethnography**, this method demands a continuous awareness of one’s role and influence in the research process. In many ways, this project also reflects my own narrative—*my* experience and positionality as a fieldwork researcher is embedded in the study as well.

Auto-ethnography played a crucial role in observing how narratives were not only shared during the interviews but also performed. The performativity of the narratives was evident not just in the conversations with participants, but also in the surrounding elements of the spaces where these stories emerged. Small details, such as the generator station in the café where an interview took place or the power banks participants carried with them as back-up technological solutions for recharging their electric devices, not only embodied the performativity of urban resilience and adaptation but also added validity to their stories.

These objects became integral to the narrative, reflecting how participants had integrated these technologies into their daily lives. This approach also allowed me to gather visual material, including photographs of the appliances and alternative technologies residents used during blackouts, as well as DIY solutions they created. As Law (2000) suggests, “we tell stories about ourselves as we perform our situated knowledges,” – in this regard, the interplay between storytelling and the material realities of the urban residents is also an important element of the larger narrative.

Conducting interviews in participants' homes was also a crucial aspect of the auto-ethnographic component of this project. Being physically present in private living spaces provided a firsthand look at how they managed power outages with alternative technologies. Observing the devices they used every day and how these fit into their updated routines was crucial for understating coping strategies in a way that would not have been possible through remote or virtual interviews.

In line with Czarniawska's (2004) idea of conceptualizing narrative interviews as both sites of research and narrative production, the interviews became more than just transcripts; they were **"stories of the field"** themselves. Each setting—whether a participant's living room, a neighborhood café, or a hospital—shaped the narratives that were (co-)constructed within them. The environments played an essential role in how these stories were told, performed, and revealed. In this sense, my presence in the field, along with the context in which the interviews took place, was reflected in what kind of knowledge was co-constructed and what senses participants made out of these experiences.

Limitations: By the summer of 2023, power outages had temporarily stabilized, making it easier to conduct the research. However, this also presented a limitation to the auto-ethnographic component of the study. Because blackouts were no longer occurring frequently, I could not directly experience or observe them during the fieldwork. As a result, I had to rely on participants' retrospective accounts rather than my own firsthand observations. This shift in focus required to complement the data with the personal experiences of local residents to capture the full depth of their stories. While this reliance on retrospective accounts posed a challenge, the auto-ethnographic element remained nevertheless crucial. It provided context to the research, allowing me, as the researcher—though influenced by the stories shared—to have my perspective reflected in the overall findings.

5.3. Narrative Interviewing

Social scientists frequently rely on qualitative interviews as a core research method due to their direct engagement with participants (Jensen, 2016). To explore how Kyiv's urban residents cope with power outages and blackouts and the senses they make from these experiences, qualitative interviews were the most suitable approach. For this study, I chose to use narrative interviewing as the primary and more tailored to this research method of interacting with the locals.

Social science researchers, who adopt and favor narrative interviews as a qualitative methods technique, like to cite the quote of Roland Barthes (1993, p. 251-252): "(...) narrative is present in every

age, in every place, in every society (...)" Key idea is that the narratives are present in our lives everywhere.

The word *narrare* can be translated from Latin as to make a story or report (Jovchelovitch and Bauer, 2000). Jovchelovitch and Bauer (2000) envisage narrative interview as "a setting that encourages and stimulates an interviewee (who in NI is called an *informant*) to tell a story about some significant event in their life and social context". Barbara Czarniawska (2004) treats an interview as an interaction and a narrative production site. In my study, narrative interviews have become not merely a set of recorded conversations of the "informants" retelling the stories and (collective) visions of their experience with blackouts, but a site of a narrative production itself (Czarniawska, 2004). In this way, narratives are also useful to look into how sensemaking occurs through construction of narratives [SQ1], and in this way the participants become not merely interviewees responding to the questions, but sensemakers and narrators *per se*.

"The narrative interview is a technique for generating stories" (Jovchelovitch and Bauer, 2000) - in this way it enables not only to get closer to the narratives that exist and circulate in the contextualized knowledge-making framework but also observe as the narratives are simultaneously constructed on the site of the interview. Narrative interviewing has become a useful method to see how narratives of resilience as the forms of knowledge are performed through the residents coping with power outages using makeshift tactics and vice versa how coping strategies contribute to the social construction of narratives of resilience. This performativity aspect of narration is crucial, as per Haraway (2013, as mentioned in Borie et al., 2019, p. 105), narratives are not "flat discourses" but they are deeply "embedded in practice".

The stories of urban residents' experiences of coping with power outages are also in a way a form of knowledge where sensemaking occurs, because through these stories people construct senses out of these events. In this way narrative interviewing is a useful tool which perfectly aligns with the sensemaking theory as an analytical lens to look at not only what participants narrate about their experiences but also how they reflect on and interpret the events [SQ1]. It is also a helpful technique to explore the stories of (successful) coping tactics with power disruptions [SQ2], and how narratives of resilience emerge, sometimes also in an interview setting [SQ3].

5.3.1. Recruiting Participants

Given the focus on capturing in-depth narratives, it was crucial to recruit participants who had directly experienced the power outages in Kyiv and were willing to share their insights. The criteria for selecting participants were fairly minimal, focusing primarily on temporal and locational requirements. Participants needed to have been in Kyiv between October 2022 and February 2023 to ensure their direct experience with the infrastructure disruptions and power outages during that period. Diversity in age and gender was a preferred recruiting criterion, as the study did not intend to limit the findings to a specific demographic group.

I employed two main strategies to recruit participants: social media outreach and personal networks.

1. Social Media Outreach

A few weeks before arriving in Kyiv, I posted on my personal Facebook and Instagram pages, inviting individuals to voluntarily participate in interviews about their experiences and coping strategies during the blackouts in Ukraine.

In my recruitment post, which was shared on my personal Facebook and Instagram pages, I invited participants to take part in interviews lasting 30-60 minutes. The post, written in Ukrainian, explained that the study is being conducted in the framework of the master's study at the University of Vienna and aims to explore how residents in Ukraine coped with disruptions in electricity supply and blackouts caused by the Russian aggression. The post specifically called for individuals who were in Kyiv during the autumn-winter period of 2022/2023 and who had experience dealing with these blackouts. I encouraged anyone willing to share their experiences and strategies for managing the lack of electricity and heating to contact me directly via private message.

To motivate participation, two benefits were highlighted. Firstly, through their participation, participants could contribute to attention and a better understanding of the realities in Ukraine within academic circles across Europe, particularly given the declining media coverage of events in Ukraine. The second point was simply doing a good deed on a voluntary basis. In this way, the idea was, following Jensen (2016) guidelines of persuading individuals to participate in social research, by appealing to “altruistic motivations” of people willing to share their often disregarded and misheard experiences in an interview setting.

This method proved to be moderately effective, yielding four out of the eleven participants. These individuals reached out to me through Instagram and Facebook Messenger, expressing their interest in participating. However, some of them had concerns about the recording of the interviews and asked follow-up questions regarding the publication of the results and whether their names or positions would be disclosed in the final research product.

2. Personal Contacts

I also leveraged my network of personal contacts, through which I managed to recruit seven participants. This approach enabled me to recruit participants from diverse professional and life backgrounds to capture a broader range of experiences and perspectives on coping with the power outages in Kyiv. This diversity was important because individuals from different professions—such as education, medicine, IT, business, journalism, and design—faced unique challenges and developed their distinct strategies to manage the disruptions. I also scheduled an interview with one senior citizen on the condition that it would not be recorded.

Securing interviews with medical professionals was particularly challenging, as I wanted to understand their coping strategies not only in their personal lives but also in their professional roles. In the end, I managed to schedule two interviews with medical workers:

- One interview was conducted with a practicing Gastroenterologist at the Centre of Innovative Medical Technologies in Kyiv. This interview was spontaneously arranged in June 2023 when I met the participant at the Ukraine Forum Conference held at the Diplomatic Academy of Vienna. We verbally agreed to conduct the interview at their workplace during my visit to Kyiv.
- The second interview was with an Assistant Surgeon at the Institute of Traumatology and Orthopedics of the National Academy of Sciences of Ukraine. This participant was contacted through my personal network, and we scheduled the interview to take place after their work shift.

By including participants with varied experiences, the idea was to secure a more nuanced understanding of how different segments of the urban population adapted to power cuts and blackouts.

What united these diverse individuals, however, was that they were all ordinary people, or speaking academically, “lay experts,” when it came to handling power outages through technological

adaptations. Despite their expertise in their respective professional fields, none of them were experts in managing energy disruptions, either in their daily lives or in their workplaces. This commonality allowed me to study diverse experiences of ordinary residents, depending on their professional and life backgrounds, drawing on their situated and context-specific knowledge to respond to infrastructure disruptions in Kyiv with both the specific and general ways.

5.3.2. Interviewing Locals

During three weeks of fieldwork in July 2023 in Kyiv, I scheduled and conducted ten interviews with eleven participants in total. The interviews were conducted in either Ukrainian or Russian, depending on the personal language preferences of the participants. The majority of these were **individual narrative interviews**, conducted face-to-face and recorded, with two exceptions—a paired interview—and another interview conducted over the phone due to the participant's request for privacy, which was not recorded.

The **paired interview** was not initially planned. One of the participants responded to my recruiting post on social media and expressed a desire to participate with their partner. A paired interview is defined “as one researcher interviewing two people together for the purposes of collecting information about how the pair perceives the same event or phenomenon” (Cartwright et al., 2016, p. 1551). However, a paired interview does not simply combine two individual interviews; instead, “paired depth interviews flow as conversations between two interviewees are being observed by an interviewer” (Cartwright et al., 2016, p. 1551). In this case, the interview developed into a lively interaction and exchange of experiences between a couple residing on the outskirts of the city during severe blackouts. I took on the role of observer, allowing their spontaneous dialogue between the participants to unfold.

A **phone interview** was also not part of the original research design. During the fieldwork, one participant expressed a strong desire to share their experiences but was uncomfortable with an in-person interview due to health reasons. Additionally, they preferred that the conversation not be recorded. This unplanned adaptation allowed the participant to take part in a way that felt comfortable for them.

As mentioned earlier, each interview had its own **setting**, adding a unique flavor to the conversations. Some participants welcomed me into their homes, where the cozy atmosphere seemed to encourage deeper, more personal stories. Others preferred meeting in cafes during their lunch breaks, offering a casual, public backdrop that shaped the vibe of our conversation. One medical worker invited me into their office, and the professional environment lent a different feel to the discussion. These varying

environments not only set the tone for each interaction but also influenced the content and depth of the narratives shared. For instance, the intimacy of a home setting often contributed to more personal and emotional stories compared to the relative detachment of a public café or the structured atmosphere of a professional setting. This dynamic interaction between space and what narratives emerged in various interview settings highlighted how the context can shape not just what stories are narrated but also *how* they are narrated.

Generally, conducting the interviews I tried to follow the self-generating scheme of a narrative interviews, with one of the core components named as “closing the gestalt”, whereby it is recommended to structure (even) the narrative interview in a “logical” temporal order so that the storytelling unfolds smoothly and unintentionally (Jovchelovitch & Bauer, 2000). In this scheme, a key event (in my case the experience of and coping mechanisms with power outages since October 2022 to the times the interviews took place) in the narrative should be fully reported, including a beginning, middle, and end. If the event was ongoing, the present moment served as the story's ending (Jovchelovitch & Bauer, 2000).

I had an interview guide (see Appendixes 10.1.) always at hand during the interviews. However, it served primarily as a supplementary tool, as some questions needed to be paraphrased on the spot. At times, certain questions were not relevant to the ongoing narrative or felt out of place within the context of a narrator's story. Like any qualitative research technique, narrative interviewing demanded flexibility and empathy.

The conversations were often kicked off with prompts like, “Can you recall when the power outages first occurred and what was your initial reaction?” to set the stage for the narrative. This meant responding to participants' stories in real time, often asking follow-up or probing questions to delve deeper (Jensen, 2016). Questions such as, “How was it for you?” and “How did you interpret...?” were some of the prompts I used to encourage participants to reflect and articulate their perceptions of the situation. This approach naturally led to closing questions about when participants noticed that the outages had become rare or had stopped and their thoughts on future disruptions and preparedness.

It is important to acknowledge that narratives did not emerge in every interview, and not all conversations naturally turned into complete narratives. Often, the stories had to be drawn out from the interview recordings and notes after the fact. In this respect, I adopted the concept of “semi-structured interviewing enriched by narratives,” as discussed by Jovchelovitch and Bauer (2000). This approach views interviewing as a flexible tool, with narrative elements appearing organically rather than consistently throughout the interview.

Reflecting on the method, I found that the narrative interviews were often empowering for the participants. Many of them seemed to view these conversations as an opportunity to share and reflect on their experiences, even though those experiences were challenging. I often sensed that participants appreciated knowing that the outcomes of the study could potentially reach a broader audience, expanding beyond their immediate context and community. For me, however, the process was often accompanied by anxiety, particularly regarding the ethical and respectful approach required when engaging with participants in vulnerable positions. The ethical considerations related to interviewing and conducting empirical fieldwork will be addressed in more detail in the following section.

5.3.3. Ethical Considerations

Ethical considerations were a central focus throughout the research process, particularly given the sensitive nature of the subject matter and its potential emotional impact on both participants and myself. Before entering the field, I made efforts to anticipate potential ethical challenges and developed mitigation strategies accordingly. These issues of ethical decision-making were also discussed in-depth during the preparation of the fieldwork with a smaller group of master's students and my supervisor.

Confidentiality, **pseudonymity**, and the **informed consent** of all participants were paramount (Jensen & Laurie, 2016), particularly given the fact that the interviews often touched on deeply emotional or traumatic experiences, such as coping with blackouts during wartime. Prior to each interview, participants were required to sign an informed consent form (see Appendixes 10.2 and 10.3), which was provided in both English and Ukrainian to ensure clear communication. Although many participants spoke English, conducting the interviews in their own language helped create a more authentic and comfortable space, allowing them to share their experiences without the language barrier.

Before beginning the recording, I reviewed the consent form with each participant, explaining the purpose of the research, how their data would be used, and emphasizing that their participation was entirely voluntary, with the option to withdraw at any point. For the phone interview, obtaining informed consent required a slightly different approach. Since the participant was not comfortable with an in-person interview and requested that the conversation not be recorded, I explained the consent process verbally and received a verbal agreement to proceed.

The auto-ethnographic approach inherently involved my personal experiences and perspective. It was also important to consider in terms of pre-existing relationships with some of the participants and how these have shaped their responses. For instance, I often found that conversations with participants

from my personal network often felt more natural and open, while those with individuals I reached out to externally tended to carry a slightly more formal tone. In this regard, I recognize that these **familiarity dynamics** may have introduced bias, as participants from my network might have felt more comfortable sharing certain details or perspectives. Despite this, the mix of relationships still offered a more diverse range of insights throughout the fieldwork.

In terms of emotional toll, discussing challenging topics such as power outages, wartime disruptions, and coping strategies could have been emotionally distressing for some participants. I made a conscious effort to remain attentive to signs of discomfort and skipped questions if I sensed they were too sensitive to address at that moment. This approach allowed the narrative interviews to be a space where participants could share the aspects of their experiences they felt more comfortable discussing, even if those moments were difficult to recall.

After each interview, I offered participants the opportunity for **debriefing** if they wanted further discussion and where appropriate. During these **follow-up** interactions, it was crucial to check in on how they felt about the interview process and whether they needed any additional support. This approach helped to ensure that the participants felt valued and heard. After all, ethical integrity did not cease to exist after the recording had stopped, and continued throughout the research process, particularly while presenting their stories with respect and care, and avoiding exploitation or sensationalism.

5.3.4. My Positionality

Acknowledging my positionality, particularly in an auto-ethnographic study, was an essential ethical consideration as well. My background, experiences, and presence inevitably shaped the interviews and interactions. It was necessary to continuously **self-reflect** on how these factors influenced the data and the participants' responses. I constantly questioned my role and position in the research, asking, "Who am *I* in this study?" and considering how my identity impacted the narratives that emerged and the knowledge production process.

In this context of self-reflection, situated knowledge of a researcher is especially relevant (Caretta, 2015), as it highlights the importance of understanding how my role as both an "internal" person and an "external" researcher (due to the study being formally conducted at the University of Vienna) may have shaped the way participants responded. This dual nature of being **both an insider and outsider** created a dynamic where participants may have felt more or less comfortable sharing certain aspects of their experiences, knowing that their narratives would reach an international audience.

In line with Jovchelovitch & Bauer's (2000) discussion of the interviewer's role, there was a tricky balancing during narrative interviews. While I aimed to approach each conversation with an open mind and minimal assumptions, participants were aware that I had some familiarity with the context and had conducted other interviews. As Jovchelovitch & Bauer (2000) highlight, participants often adjust their responses based on what they think the interviewer knows. My coping strategy in terms of positionality during the interviews was to avoid the "pretend play of naivety" (Jovchelovitch & Bauer, 2000) and to remain transparent about my background and the research process. In the end, this helped foster authentic exchanges where participants could share their stories without feeling they needed to explain what I might have already understood.

5.4. Data Analysis: Open Coding, Mapping, Extracting Themes

By the time I concluded the fieldwork, I had amassed a total of nine interview recordings—eight from in-person interviews and one from a paired interview—along with several pages of bullet points and notes from a phone interview that was not recorded. In total, the recordings amounted to 304 minutes, with the average interview lasting between 35 to 45 minutes. The shortest interview was with a medical worker, lasting 18 minutes due to their tight schedule, while the longest recording was a paired interview, lasting 1 hour and 4 minutes.

I manually transcribed the first four interviews but found the process to be time- and resource-consuming. Consequently, I utilized an online transcribing tool – Transkriptor.com⁴ – to convert the remaining audio recordings into text. Following this, I conducted manual coding and thematic analysis on the completed transcriptions.

The method employed for interview analysis was **qualitative coding**, specifically initial coding, also known as **open coding** (Jensen & Laurie, 2016). This approach involved coding the interview transcripts with approximately 50-60 codes per interview. The process included constant review of the transcripts, as well as the reorganization of codes and categories. Broader categories and pertinent quotes were translated from the original interview languages into English using DeepL Translator and occasionally ChatGPT to save time.

For the extraction of categories and themes, I utilized a "framework approach" (Rivas, 2018), organizing the data into tables following the analysis scheme of "Code => Category => Theme." Throughout this process, I kept my research questions in mind and aimed to split categories to prevent

⁴ <https://transkriptor.com/>

overly broad units of analysis. Some codes and categories emerged that did not fit neatly into the broader themes; however, these were still retained and analyzed within the framework of an inductive approach. This method involves participants taking an active role in knowledge-making practices, with data being collected and then analyzed to identify patterns.

Key elements in the analysis were storytelling, sensemaking, contextualization, temporal dimension, social construction of reality, and reflective accounts. These aspects were essential for capturing the depth and nuances of the participants' narratives.

Initially, I attempted to organize codes, categories, and themes using linear tables and spider diagrams. While these methods were useful, I ultimately found that mapping the narratives and visualizing the emerging trends was particularly beneficial for data analysis. The power of visualization became apparent when I started using a Sketchboard⁵ for this purpose. Using visualization tools provided clear advantages over traditional tables. Seeing the data mapped out visually made it much easier to grasp the relationships and connections between different parts of the analysis (see Appendixes 10.4). This method was not only more engaging but also offered a flexible way to explore and organize the information, which helped me better understand and interpret the complex relationships within the narratives.

As the analysis progressed, four overarching themes emerged from the categories: challenges related to power outages, adaptation, emotional responses, and support mechanisms. The theme of **Challenges Related to Power Outages** captured the diverse difficulties urban residents faced with power cuts and blackouts, particularly in the context of the ongoing war. This included disruptions to daily routines, difficulties with technological adaptation, and the emotional strain of dealing with the dynamically changing challenging situation.

Emotional Responses covered several aspects, including initial reactions to power outages, the impact of prolonged blackouts on mental health, the process of accepting and normalizing the situation, and the anticipation and preparedness for future outages. It also included how participants cared for their loved ones and reflected on the role of electricity, internet, and connectivity in modern technological cultures. The emotional coping strategies employed by participants were a significant focus.

Mapping these themes revealed how interconnected the smaller categories and broader themes were. For example, the theme of **Adaptation to Power Outages** was closely linked to emotional

⁵ <https://sketchboard.me/>

adaptation and coping with the daily challenges of power outages. Adaptation involved not only acquiring new skills and knowledge but also navigating the duality of using versus *not* using alternative technologies, often intersecting with socio-economic challenges like the inability to afford a portable power station or generator.

The theme of **Collective Initiatives & Support Networks** naturally flowed from adaptation and reflected various levels of response. This theme encompassed individual home adaptations, informal neighborhood initiatives, and larger grassroots support mechanisms of a semi-formal nature.

Following Czarniawska (2009), interview transcripts functioned as larger narratives, capturing the stories that emerged during conversations. Analyzing a narrative interview involved not only understanding “what is said but also examining how and why it is said” (Czarniawska, 2009, p. 49). While reviewing the interviews, I paid close attention to participants’ non-verbal cues, such as laughter, chuckling, or reflecting on challenging situations in the joke form. This attention to non-verbal responses and behavior patterns provided insight into how participants adapted to power loss, both in their storytelling and in their adjustment of the narrative.

In social science research, an important consideration with narrative interviews is the variability in narratives. How can the validity and credibility of what is being said be proven? Bruner (2004, p. 693) also notes the “problems of verification” of narratives as “folk theories”, “accounts of one’s life”. According to Jovchelovitch and Bauer (2000), narratives offer a window into the different viewpoints of participants regarding events and their personal experiences. At the same time, using standardized questions allows for straightforward comparisons between interviews on similar topics. Czarniawska (2004) also notes that “words cannot be compared to worlds,” and validation often involves “checking texts against other texts” (p. 133). For instance, differing perceptions of collective unity and resource sharing during times of scarcity illustrate this point.

Czarniawska (2004) also points out that although each narrative is distinct, it is unrealistic to expect that someone would create an entirely new story just for a specific researcher, insofar as narratives are generally “well rehearsed and crafted in a legitimate logic” (Czarniawska, 2004, p. 49). This aligns with Donna Haraway’s (1988) perspective on objective local knowledges, which highlights the value of analyzing diverse narratives, producing unique kinds of knowledge.

6. Empirical Findings – a Kaleidoscope of Narratives

“It matters what stories we tell to tell other stories with; it matters what knots knot knots, what thoughts think thoughts, what descriptions describe descriptions, what ties tie ties. It matters what stories make worlds, what worlds make stories.”

– Donna Haraway, *Staying with the Trouble* (2016)

The Empirical Findings section is titled “A Kaleidoscope of Narratives” to reflect the dynamic and multifaceted empirical findings – different blackout survival stories and shared by the participants and different ways they reflected on the experiences in the course of the narrative interviews and the observations I made during the three-week fieldwork in Kyiv in July of 2023.

Just like in a **kaleidoscope**, where the fragments of coloured glass and mirrors produce different patterns every time they are rotated, multiple narratives on the ways of coping with power outages and blackouts are produced depending on how multiple “pieces” (the stories shared during the narrative interviews, ethnographic observations, my personal reflections) are reassembled to reflect one of the many patterns (read: the ways) of navigating the living off the grid at the moment of time this study was conducted. Despite not being experts in the realm of electricity and power supply, the local residents reflected on their interpretations of challenges and the ways of adaptations prompted by unpredictable power outages and prolonged blackouts. Each story, every small detail recounted, has become a separate coloured glass of a kaleidoscope of blackout survival experiences, some of the glasses mirroring each other.

The structure of this section reflects the overarching narrative of the study: I begin with the challenges posed by power outages and blackouts in both private and professional realms. Then I look into the various ways of coping with the absence of electricity and connection the residents have reported, detailing both technological and emotional adaptations, as well as the meanings constructed by these challenging experiences. Last but not least, I conclude this section by examining larger bottom-up societal resilience mechanisms and communal support initiatives that have emerged in response to the events, discussing their temporality and their role in constructing an overarching collective resilience narrative.

6.1. Power-Less: The Challenges of Outages

To mitigate the challenges of target infrastructure breakdowns and ensure the power grids were not overloaded during these already tumultuous times, Ukrainian authorities in cooperation with the largest energy operators of Ukraine, implemented a system of electricity consumption restrictions or scheduled power outages (Magramo & Berlinger, 2022). That is what the participants mentioned a lot in their narratives about the “winter of blackouts”, starting from early October 2022 and temporarily ceasing in early spring of 2023. These accounts have been fact-checked with other open sources.

However, as necessary as these power restrictions were, they introduced their own set of complications, failing to work ideally and adding another layer of unpredictability to daily life of the residents of Kyiv. The participants I spoke to, acknowledged this complex reality, adding to the multifaceted nature of vulnerabilities they faced living through this particularly uncertain period of time, since the broader socio-political context of warfare has been complicated by the disruptions of the very mundane daily activities that required electricity, cell and Internet connection.

In times of warfare, technologies such as electricity—and the capabilities they enabled—often served as the last island of stability for many locals. However, at a certain point, even that island of stability began to drift away.

6.1.1. Life on the Clock: Power Cuts Schedule

Against this backdrop of constant uncertainty, scheduled and unscheduled power outages became a defining aspect of the lives of those who remained in the city during autumn and winter season 2022/2023. The residents reported the common tendency of the local populace to leave the city for the uncertain period of time and to winter in the rural areas, if there had been such a possibility, for there was less dependency on the centralized electricity supplies and more opportunities for autonomy heating.

As I talked with the residents, who for many reasons, had to winter in Kyiv, they would often begin their narratives with the challenges of maintaining their daily routines as the power cuts became a commonplace. Participant 3 shared with that regard: “they [plans] started to constantly shift because the plans I continually made got disrupted,” (P3, 16-17) capturing the essence of the unpredictability of the electricity, connectivity and the daily routines many residents of the city faced. The sentiment of having to adapt to ever-changing unpredictable circumstances was further mirrored by Participant 9, who remarked

with a hint of humor, “what I initially planned often turned out completely differently” (P9, phone interview, 16.07.2023).

As I continued discussing with the participants the challenges of maintaining the daily routines during unpredictable power availability, it became clear at some point that the unplanned emergency power-cuts were also related to the technical reasons. For example, Participant 2 described how shelling that caused severe damage to power stations or distribution transformers necessitated immediate, albeit temporary, power cut offs to allow for emergency repairs. This interruption often occurred off the planned schedule, causing significant inconvenience for the locals to arrange their daily lives.

Participant 2 explained: “well, there were emergency outages when there wasn’t enough voltage, and they [the energy companies] had to cut the electricity off. There were also outages for emergency repairs, after shelling, for example... They turned off scheduled outages for some reason off the schedule – an hour before or an hour after or half an hour (...)” (P2, 31-34). Participant 1 interpreted the logic of power cuts likewise, recalling that “unscheduled outages occurred during shelling, while the planned ones happened when they [emergency services] needed to restore power to avoid overloading the power grid” (P1, 195-196).

The unpredictability of these outages added an emotional strain, with the residents interviewed recalling feeling “very upset, as there was a lot of aggression, a lot of despair, especially when it [the power cut] happened not according to the schedule” (P2, 25-27).

The need for a “double” adaptation to unpredictable power cuts led the locals to develop new routines around the power outage schedules. There was a need to integrate power outage schedules into their private schedules and daily routines, which often relied heavily on the accessibility of electricity and connection.

For some, like Participant 11, the challenge of the power outages schedule meant adjusting routines to fit limited power windows at home, efficiently organizing essential tasks around brief periods of electricity. For others, like Participant 6, the challenge of disrupted electricity supply involved seeking alternative locations with uninterrupted power to maintain daily routines.

Participant 6 also showed a screenshot with the schedule of the planned power outages as a wallpaper on their phone (Figure 1). The image displayed a detailed schedule of the planned power outages for their specific address, a service provided by DTEK, the largest Ukrainian operator of electric power distribution systems.

The schedule was meticulously organized, with times listed on the left, visually dividing the schedule into sections marked by squares of different shades. Dark gray squares, adorned with a crossed-out lightning bolt symbol, indicated the times when electricity was scheduled to be cut off in their building. Light gray squares represented potential power outages, suggesting times when electricity might be unavailable but not definitively scheduled for a cut. White squares signaled hours when electricity was expected to be supplied. This story was accompanied with light-hearted jokes about the situation in a way that power cuts schedules had to be incorporated into P6's work and private calendar.



Figure 1. A Screenshot With The Schedule of The Planned Power Cuts

However, as most participants confirmed in the following conversations, the reality often did not align with these schedules, which was one of the most annoying aspects during the first times of the electricity challenges.

The locals displayed a readiness to adapt to power cuts by adjusting routines, yet desired predictable schedules to stabilize daily life—an expectation often unmet in wartime. The residents noted the frequent inaccuracies in power-outage timing, describing a typical variance of about four hours. It appeared to be a collectively acknowledged unreliability of planned outages, reflecting a shared challenge in aligning routines with fluctuating power access. Essentially, everyone found themselves living without any plans, adapting day by day to the unpredictable circumstances – the starting point of a broader narrative of coping with systemic uncertainty.

The power outages, especially since October 2022, redefined daily existence, forcing residents to engage in continuous emotional labor, characterized by constant anticipation and preparedness. This emotional and mental toll permeated every aspect of life, as the inability to rely on a stable electricity schedule brought a profound disruption to routines and household functioning.

Often unreliable, the power outage schedule has itself become an agent of disruption, unsettling the agency of the residents, as residents were forced into a reactive mode of existence, constantly adjusting to an unstable environment. In a way, the power grid dictated the rhythm of their days, stripping individuals of control over their own time. These outages exemplify how external structures—like electricity infrastructure— can impose constraints and limit personal agency, adding another layer of vulnerability to the participants' experiences, as their usual social rhythms have been altered by the often unreliable power cuts schedules, they had to adjust their lives to.

As a result, the residents often found themselves excluded and marginalized from their usual daily routines, having to complete their daily assignments at night or whenever the electricity was restored. Innerarity and Kingery (2012, p. 80) state that marginalization in its interpretation related to time, is no longer limited by spatial constraints, but is related to “living in another time”. Such desynchronization has had lasting effects on the residents' lives, as P1 recalled that for a while, they “continued to live by the power cuts schedules, even though there haven't been power outages for a quite long period of time.” (P1, 24-25)

From an auto-ethnographic perspective, power disruptions were not just a part of the residents' experience, but also a significant factor in my own fieldwork. The challenge of conducting interviews in the affected area brought a new layer to my research process. I, too, was subject to the unpredictability of electricity and connection, experiencing firsthand the emotional and logistical toll of adjusting the fieldwork if need be. This shared vulnerability also added another layer to the shaping of knowledge production on the research site.

6.1.2. More Than Lights Out

As I ventured deeper into the realities constructed by these power outages, it became clear that the impact was profoundly felt in the basic aspects of life and household functioning. Electricity, water, and heating—the fundamental pillars of a comfortable home—were disrupted, posing significant challenges to everyday worlds of the urban residents.

This aspect has been continuously reiterated by all narrators and was present in each individual's account about primary concerns and challenges the residents faced as a consequence of the power cuts and blackouts amidst the wartime. I deliberately provided enough time for the participants to narrate about these challenging aspects (and will now give enough space in this section for these stories) because recalling these early-time difficulties provided a trampoline for recalling and reflecting on the experience of gradual adaptation, development of resilience (Vale & Campanella, 2005) and contributed to a construction of the narrative accounts in a chronological and logical manner. It was also vital for analyzing memories practices of the participants and how they construct their stories around the coping mechanisms they took up to master their "living off the grid" in the urban fabric.

These experiences, shared across a spectrum of residents, revealed multiplicity of vulnerabilities the local population had to face up with spanning from dependency on centralized electricity supply, the absence of electricity, heating, water and connection to the generally harsh weather conditions in winter and the overarching wartime context.

As is common in the larger urban areas, city dwellers are usually heavily reliant on centralized electricity supplies, especially those residing in multi-storey residential buildings. The stories the residents shared with me proved this statement. P1 (27-31), having not long before the blackouts have started, transitioned to a new building fully reliant on electricity, found themselves grappling with the immediate impact of electricity dependency when their new, fully electric building lost power, leaving them without heat and the means to cook amidst they were sick with Covid.

Similarly, this vulnerability of being dependent from electricity to maintain usual household routines, was underlined by P8, who mentioned that despite having gas heating boilers, the requirement for electricity to operate these systems meant that heating was unavailable during power outages (P8, 114-116). P7's experience adds to the already difficult situation described by the previous participants, "our gas boilers also work on electricity, (...) so, we had no heating in our building when there were strong frosts, the longest blackout was on December 19th, it lasted for four days" (P7, 48-52).

P1 also shared the emotional toll of being psychologically prepared to and stressed out by the recurring blackouts, linking the anticipation of power loss to the broader context of wartime shelling – another dimension of vulnerabilities the residents faced. They recalled, "it was so ingrained in my head that I constantly associated these shellings with the blackout and the fact that there will be neither heat nor the ability to cook." (P1, 73-75) – a narrative highlighting the intertwining of external conflict with the internal anxiety of managing daily life under wartime blackout conditions.

Cooking, an essential yet taken-for-granted aspect of daily life, became a significant hurdle, as articulated in the individual accounts of several other residents as well. The simple act of preparing a meal became contingent on the availability of power, leading to frustrations and adjustments: P3 simply stated, “often I could not to cook,” while P7, detailed the hasty adaptations required to prepare meals within the unpredictable windows of electricity availability: “...we [their family] hardly cooked because when there was a blackout (...) electricity was cut off for 4 hours, and then when it suddenly came back on, I quickly did everything” (P7, 59-61).

During the interviews, I tried to ask the participants a simple but important question: “What was the most difficult thing for you?” Sometimes the participants responded with a sense of humor, sometimes their answers were related to the challenges of completing the very mundane household practices of preparing meals at home or staying online to continue working, and sometimes the most difficult thing was the emotional burden of an overarching context of war.

Interpretations of what was the greatest challenge during that time showcased the multiplicity of individual and localized experiences the participants shared. The reliance on modern cooking appliances such as microwaves was among the difficulties shared, as one resident lamented the inability to heat food, a task impossible for them without electricity:

“The hardest thing for me personally was that I couldn’t heat food in the microwave. I don’t use the stove; I just throw my food in the microwave and heat it up. That was the most difficult for me” (P2, 169-170).

For P4 (126) the most difficult was “not understanding what would happen tomorrow”, for P5 (64-65) it was being disconnected from the world due to the absence of mobile network and internet connection. For P6 (144) it was “the very first day when there was the most massive shelling” due to the sudden change of the wartime life in urban environment, unpredictability of the dynamically changing conditions, and the need to adjust their work schedule and last-minute canceling of work calls with international partners, just as for P8 (108) the most challenging aspect was at the beginning of the power cuts and blackouts around October 2022.

For some participants, responding to this question turned out into narrating their experience by comparing the moral toll of experiencing the power outages and missile strikes, as they recalled: “The most challenging part was the psychological aspect, not during the blackouts but these airstrikes. That was

very difficult because it happened right in front of my eyes. This goes beyond [the power cuts], but it was much harder than when the power went out (...)" (P2, 128-130).

As mentioned during multiple conversations, the loss of power meant not only the absence of light but also the loss of heat and water, fundamental needs that, when unmet, deeply affect the quality of life: "No electricity, no heat. There was no water either. Yes, the water was out." (P3, 96). P8 detailed the severe implications of water scarcity, highlighting that the absence of water could lead not only to hygiene problems but also increase the risk of diseases due to unsanitary conditions. This concern was echoed by a P7, emphasizing the failure of water pumps to operate without electricity, and P9, who mentioned the challenges of using a washing machine during power outages.

P2 (20-21) also shared the challenges of inability to charge electronic devices due to power outages. This quote from P6 captures a moment of ironic reflection on the broader implications of the absence of power supply on their life: "...it was unclear how to continue to work, how to live, because if there's always no electricity, it's going to be "super fun" in my apartment, where I have an electric stove, and where the boiler heats the water" (P6, 26-28).

The narratives also touched on the emotional and physical toll of navigating high-rise living without elevators, a reality starkly depicted by most of the participants I have talked to. These stories reveal the complex challenges of urban living during crises, from the fear of being trapped (P3, 28) to the struggle of climbing many stairs without power "with a child, a stroller, a dog" (P2, 71).

The elevator challenge was a particularly harrowing challenge for elderly residents with an 83-year-old senior resident (P9) with mobility issues, for whom the elevator was a critical issue in the high-rise building. There was a compounded vulnerability faced by other elderly and those with physical limitations living in the high-rise concrete jungles of the urban environment, for whom blackout did more than turn off lights; it confined residents to their homes, turning basic movement into a major challenge.

From what the residents have shared, it has become evident that as the urban landscape of Kyiv was swallowed by darkness due to power outages and blackouts, the residents faced a multiplicity of challenges. This multiple nature of the vulnerabilities that residents faced was narrated differently by each resident, demonstrating that although residents lived in roughly the same conditions and timeframe, the ways in which each resident interpreted these experiences were quite diverse. Interpretations of the most challenging aspects ranged from the inability to use cooking appliances and charge electronic devices at home to the lack of water supply and malfunctioning elevators.

All of these technological and emotional challenges were compounded by the broader socio-political context of the airstrikes. This demonstrates that sensemaking practices, while localized, when shared by different people, provide multiple interpretations of challenges and produce different kinds of knowledge that respondents share. This multiplicity of interpretations will be evident when I delve into the other kinds of life disruptions experienced by urban residents as a result of the unpredictable context of recurrent power outages and war conditions.

6.1.3. Mobile and Internet Networks “Apocalypse”

As the power was cut, internet and mobile networks also stopped working profoundly impacting both personal and professional realms of the residents – the stark reality of modern (technological) cultures’ dependency on technology for basic connectivity. The voices of the participants in this study echoed a shared sentiment of disruption, isolation, and the urgent need for connectivity in times of crisis.

The memories recalled by P1 illustrate the profound impact of these blackouts on daily life and communication. P1’s recount of an evening as they went out of the subway and found themselves in silence and darkness, having lost mobile and internet connection and comparing their experience to “apocalypse” (P1, 142-143) and describing their feelings at that moment as feeling “completely cut off from the world” (P1, 147). This moment of isolation, exacerbated by no phone signal or internet, emphasized the city’s physical darkness and being cut off from the digital world, breaking the communication urban residents usually relied on. This narrative the P1 shared with me not only reflects personal struggle during the blackout but also mirrors the collective experience of being excluded and unable to access the digital lifelines of mobile networks and the internet being literally out of service.

This reflection was further amplified by other residents (P3 and P11), recalling the moments of desperation for cellular connection amidst power outages and also reflecting on the compounded challenge of poor cellular signals, which made even basic phone calls a struggle. These remarks highlighted that certain point of time when urban technological infrastructure has become extremely fragile and its failure to perform fundamental communication functions has become indeed *visible* for the urban residents.

Poor cell connection posed safety risks related to the broader context of the war. P11 recalled their inability to hear air raid sirens, particularly during power cuts. Without loudspeakers for alerts in their neighborhood, they often relied on faint sounds or, more commonly, on phone notifications about airspace threats. The lack of digital communication became an essential challenge for many other

residents in similar situations, especially as sirens failed to reach many residents, leaving them in the dark about potential dangers. These moments left residents feeling unintentionally excluded from crucial safety measures, intensifying their vulnerability during air raids. The inability to receive timely notifications heightened a sense of isolation and fear and highlighted inequalities in vulnerability exposure among different residents.

Conducting the other interviews, this story resonated with me with a universal theme found across the narratives that the participants re-constructed: *the challenge of navigating a world momentarily reverted to a pre-digital age*. In the shared experiences, the “network apocalypse” highlighted a broader narrative shared by city residents during the blackouts: a struggle not just for light and warmth, but for connection, information, and safety in a time of crisis. These experiences reveal technology’s role in shaping power dynamics, where connectivity—or its absence—becomes a source of disempowerment and a site of socio-technical exclusion. In modern society, the absence of reliable technology and connection can isolate.

6.1.4. Work on Pause

In delving into the narratives shared by the residents of Kyiv, it became evident for me that disruptions extended far beyond their daily routines and household functionalities. Indeed, as conversations unfolded with participants—spanning ages 23 to 52 and representing a broad spectrum of professions, except for one senior retiree (P9)—a recurrent narrative emerged: the significant impact of disruptions on their professional lives as well as the broader implications for work culture and the resilience of the urban workforce amidst the crises.

Damages to urban critical energy infrastructure, which resulted in the loss of essential services such as electricity, the internet, mobile networks, and, fundamentally, lights, made previously invisible mundane aspects of urban life visible. This “deep taken-for-grantedness and invisibility” of power supply, as articulated by Graham and Thrift (2007, p. 8), suddenly manifested into a tangible challenge for individuals across various professional fields.

In this regard, it is vital to contextualize the broader socio systemic backdrop against which these individuals were operating. Here, I refer to the lack of a robust social support system in numerous countries—a reality that becomes even more pronounced during times of crisis. In such contexts, the continuity of work amidst adverse conditions is not just a matter of resilience or adaptability; it is a

necessity. Individuals find themselves without the safety net of social programs that, even under normal circumstances, offer limited support.

As discussed with numerous participants, most of them shared during the conversations that they had no choice but to rely predominantly on their own resources and ingenuity to carry on with their professional duties, irrespective of the challenges they face. It paints a picture of a society where, in the face of crises, people must fend for themselves. Despite possessing expertise within their own professional domains or areas of study, suddenly the residents of a blacked out city found themselves navigating the unfamiliar territory of unpredictable power outages that could last several days.

For some of them, keeping up their work routine as part of the larger daily routines has become a coping strategy itself. Although not straightforwardly addressed and narrated, adjusting and maintaining work routines was an integral part for many residents to keep up their “normal” lives despite the harsh realities. The residents reported about various challenges, spanning from having to work at night to capitalize on moments of power availability (P3) and sharing their frustration with the unpredictability of the power supply and how much it affected her work life (P1).

Adjusting work schedules to the schedules of power cuts was one of the biggest challenges mentioned by several participants. As P1 said, it was all about redesigning work schedules to work during the slots where power was supposed to be available. They recounted the conscious decision to move their work completely to the office. This move, facilitated by the presence of a generator at the office, allowed for extended work hours, a necessary adaptation to meet their professional deadlines: “Sometimes it was that I would arrive there at 9 am in the morning and leave at about 9 or 10 pm in the evening, just to make it before the curfew⁶” (P1, 42-43).

The challenge of arranging lives in accordance to multiple top-down imposed schedules (power cuts schedules, curfew, normal hours working schedules) has been driven by fear of being *desynchronized* (Innerarity & Kingerly, 2012) from life, marginalized, excluded and even punished (e.g. in the case of curfew or if the deadlines at work are not met) had the the lives routines not been adapted to the dynamically changing environments. Time and adjusting lives around new time frames has become a challenge itself.

⁶ The curfew referenced was introduced at the onset of hostilities on February 24, 2022. This measure was implemented as a part of the emergency response to maintain public safety and order, requiring residents to adhere to restricted movement hours, typically spanning everyday from 11 pm to 5 am.

Internet connection and cell network disruptions, as discussed in the previous section, added an additional layer of constraints for the urban workforce. P10, whose work is inherently tied to constant communication, recalled initial anxiety due to the lack of a stable connection, explaining their work life required them to “always be in touch” and “reachable” (P10, 386). The need to have a stable internet connection for work has been expressed by other residents as well (P3, P7, P8). Participant 4, an assistant surgeon noted that they had to get used to charging all their devices doing anything that required the Internet connection in advance, for example, managing their professor's Instagram... They shared: “...I manage his [professor's] Instagram, so I need to meet certain deadlines to send him materials, and then he posts this content.” (P4)

To find stable internet connection for work during power outages, multiple residents reported the need to search for alternative workspaces. Some residents (P2, P10), having remote office jobs, described how they began searching for “well-lit areas to work,” highlighting a shift away from home offices to makeshift setups in public spaces. For example, P2 noted how shopping malls turned into temporary work hubs, with tables and sofas filling up as people tried to stay productive. This unplanned shift to public spaces shows how disruptions in infrastructure can reconfigure urban spaces, turning commercial areas into shared resources.

The challenge of maintaining working routines also encouraged new forms of social collaboration. Participant 6 described how they organized an impromptu “coworking space” by teaming up with colleagues who lived in buildings that shared a power line with critical facilities like hospitals (P6, 45-48). These buildings were less affected by outages. The setup allowed access to a stable power supply, transforming residential spaces into shared work zones. By rethinking the resources available collectively, residents created ad-hoc micro-communities that provided both functional support and social connection. In this sense, infrastructure breakdowns led to new social configurations symbolizing care and resilience.

For the urban healthcare workers, the daily routine has also transformed radically. Interviews with P4 and P5, both deeply embedded in the medical field, shed light on the impact of these outages. The challenges began with a significant reduction in patient volume, as people hesitated to seek medical care amidst the uncertainty of power supply. Participant 4 noted that the situation was far from the usual one, as they observed a significant reduction in patient volume and hospitalizations, the recurrent “walking down an empty corridor [in the hospital]” (P4, 207), which had a direct impact on the quality of healthcare provision and the financial stability of the medical staff. P4 explained that the patients, though

having planned operations, often canceled them last minute, because there were “frequent and massive” (P4, 206) shellings and prolonged absence of power.

Similarly, Participant 5, head of the gastroenterological department at a hospital, echoed this narrative. In their account, P5 (29) mentioned that “the operating hours of the clinic were limited and shortened” as a consequence of unstable power supply made to accommodate the erratic power supply underscored a broader disruption to healthcare services. While some areas of the hospital could rely on uninterruptible power sources, other parts were not as fortunate.

The dependence on the power supply, the need to adjust work schedules to the new reality, the time pressure and the general uncertainty have affected the working lives of many residents when faced with power outages. For many of them, the struggle to maintain consistent access to the mobile network and internet emerged as a critical issue, sometimes having a more profound impact on their professional lives than the absence of light.

However, adversity often breeds innovation and adaptability. As I transition from exploring the challenges faced by urban residents during power outages, the next section aims to shift the focus towards diverse coping strategies and technological adaptations devised by the residents in response to blackouts.

6.2. Blackout Survival Stories: How They Managed Through

“That which does not kill us makes us stronger.”

— P8 (276) citing F. Nietzsche during the interview on July 19, 2023

In contemporary urban settings, dependence on centralized power supply has become acutely visible, essential for meeting the basic needs of life in the “concrete jungle.” Consequently, immediate technological adaptations have emerged in household routines—the seemingly mundane yet essential domain of urban dwellers. For some residents, it was alternative technology that played the most crucial role in helping them adapt. Others, however, were satisfied with the technology they already had, making only minor adjustments when necessary.

These adaptations manifested as caring practices, reflecting how residents engaged with technology to safeguard their well-being and that of those around them. Resorting to using alternative technology also manifested the materiality of care (Lindén & Lydahl, 2021, p. 5), where alternative

technological solutions became instruments of care by meeting essential needs and fostering resilience in everyday life.

6.2.1. (Back) To Gas: Old-School Solutions

Adjustments to unpredictable power outages often took the form of tinkering and bricolage, as participants reported improvising and experimenting with available technologies, like camping stoves and portable gas heaters, to create solutions that cared for immediate needs amid uncertain energy supplies and unpredictable power cuts.

Participant 8, for instance, mentioned the use of a mobile gas fireplace. The choice of a heating device, as reported, was motivated by the need for a flexible and effective solution to the absence of electricity. The decision was made to opt for a heating option that provided not only warmth but also added a comforting ambiance to their living space.

Adaptations of cooking routines took various forms: while some participants considered themselves “lucky” to already possess gas appliances at home, many, however, were compelled to quickly acquire portable gas stoves and cylinders to maintain their cooking routines amid power outages.

Multiple residents (P1, P2, P3, P9, P10, P11) discussed purchasing portable bhutan-fueled gas stoves (also referred to as “camping stoves”) or using existing ones for cooking if their household was equipped with such. As P1 described, when the power outages began, there was an immediate scramble for portable camping stoves, which were relatively affordable and generally safe for indoor use. “When it all started, gas stoves were selling out very fast, and the prices went up,” P1 (264-265) recalled. This sudden demand exposed differences in how prepared households were; those without gas appliances had a tougher time finding alternative ways to cook and stay warm. Residents began treating the purchase of gas canisters for their portable cookers as a routine essential, akin to buying “milk or bread” (P1, 129-130) in supermarkets.

The way the residents report about integration of new technologies in daily lives varied across their accounts. Frequently unfamiliarity with the technology and lack of necessary knowledge created barriers to integrating alternative solutions into their routines. While some residents reported having basic technical knowledge and skills enabling a smooth transition to using the gas appliances and other alternative energy sources, others experienced initial anxiety when adopting new appliances like camping gas stoves. Reflections on the level of difficulty of adaptation to alternative tech solutions varied from “it is not rocket science” (P8, 93) to “I was really afraid to use it” (P1, 90).

As some participants shared their fear of using gas appliances at home, others mentioned the use of bhutan-fueled cylinders for camping cookers was “prohibited in apartment multi-storey buildings” for safety reasons (P7, 70). This fear may have also stemmed from broader local societal narratives around safety of gas appliances, reflecting the popular perceptions of alternative gas-fueled technology as unsafe to use indoors and risky when having no prior knowledge.

The use ranged from preparing meals to heating water. In addition to cooking, camping stoves were also used to provide heat, with participants noting the added warmth from cooking as a small yet comforting benefit. In times of uncertainty, such simple and modest technologies served as more than just tools; they became acts of care, allowing residents to provide warmth and nourishment for themselves and those they cared for.

At the same time some residents remarked on the unexpected advantage of having “an old gas stove in an old building,” the power outages underscored the preparedness: “I was lucky that we had a gas stove – I could cook using it...” (P2, 66-67). In contrast to modern multi-storey buildings, where gas appliances are frequently replaced with electric ones for safety or aesthetic reasons, older infrastructures offered a form of resilience.

Relying on gas stoves in older buildings highlights how established infrastructures can unexpectedly support resilience during disruptions. Participant 11 described the gas stove as a “lifesaver” that enabled them to cook and heat water, emphasizing the risks they would have faced with an electric stove. This highlights how dependence on modern appliances can increase vulnerability. Similarly, Participant 9’s statement, “gas saved us,” emphasizes the essential role of gas appliances in maintaining resilience in de-electrified urban environments.

This suggests that historical choices and existing systems play a significant role in this dynamic and invites a closer look at the doubted concept of “technological fix” (Rosner, 2004), where reliance on newer technologies may overlook the value of traditional methods that have sustained communities for years, which in turn questions how technological evolution affects societal vulnerability and resilience. It also encourages a reassessment of what effective preparedness means in contemporary urban environments as modern technological societies are still dependent on traditional energy sources. This dependency often goes invisible in everyday life, but it becomes glaringly visible during crises.

6.2.2. Navigating the Dark: Illumination Options

In the absence of electric light during prolonged blackouts, residents also recalled creative and practical solutions to illuminate their homes to combat the oppressive nature of darkness.

Participant 7 (137-138) described the emotional difficulty of evenings devoid of light, sharing that “at 4 or 5 o’clock in the afternoon there was already no daylight” This theme was echoed by Participant 8 (244-252), who noted the profound psychological effects of darkness, linking it to feelings of depression exacerbated by external stressors like the pandemic and ongoing conflict.

The use of candles, LED-lamps and small, chargeable lanterns was reported as a widespread coping strategy with darkness among participants. These provided essential lighting and, for some, contributed to creating an atmospheric setting amidst the power outage. During the interviews, the residents revealed how candles and lanterns became more than just sources of light; they “illuminated some joy” (P8, 324-325) and often bore symbolic meaning of hope and warmth.

In that sense, even simple technologies can fulfill deeper social and emotional needs, embodying cultural meanings and fostering emotional resilience in times of crisis. Once considered mere decorations or emergency afterthoughts, LED-lamps, lanterns and candles are not merely a set of alternative lighting tools but in prolonged absence of power construct a complex web of interactions that shape human experiences, uplifting spirits, and mitigating the oppressive feel of darkness.

However, the use of candles during power outages was deeply contextualized, shaped by individual circumstances and needs. Participant 9 reflected concerns about affordability and functional limitations, stating, “I used all my candles, both wax and thin church candles; candles were expensive... I couldn't read using candlelight; I needed bright, good light.” This reflection illustrates how effectiveness of applying local coping strategies is influenced by personal context and specific needs.

While candles offered some comfort, their limitations exposed vulnerabilities, emphasizing the need for more adequate lighting options during blackouts, like the LED-lamps and flashlights. Participant 11 shared a creative approach they devised to tackle the issue of reading in dimly lit conditions during power outages. They found a dual-purpose tool—a bookmark with a flashlight. This bookmark essentially combined a traditional paper clip bookmark with a built-in LED diode and a coin cell battery.

The use of modern alternative lighting solutions was also adopted in medical environments reflecting a further developing techno-political culture of preparedness and adaptability. Participant 4

highlighted the essential role of flashlights in surgical settings, noting that they are “always there” and serve as a precise backup light source (P4, 224-225). Participant 5 further emphasized this point, explaining that during power outages, it is standard for surgical teams to rely on flashlights and headlamps to maintain operational continuity. The headlamp, in particular, exemplifies a technological adaptation that allows for hands-free illumination, enabling medical professionals to focus on their tasks while ensuring adequate lighting.

These practices illustrate how technology application is inherently localized as it shapes and is shaped by the demands of specific contexts. The integration of alternative lighting in surgery was a smaller part of the broader techno-political culture of resilience in healthcare, where the ability to adapt to disruptions is vital for patient safety and care.

Analyzing the stories shared by residents about coping with darkness during power outages, there was often also a tendency to romanticize these moments, framing the flickering lights as a nostalgic return to simpler times. Participants mentioned using battery-powered fairy lights and candles, which provided a warm atmosphere that encouraged family conversations without the usual distractions.

This reliance on alternative lighting emphasizes that, depending on individual and local contexts, technology can fulfill a caring function if its use is tailored to specific needs. The meanings residents ascribed to these lighting solutions reflect their unique circumstances and collective experiences, as adaptive strategies aimed to combine both practical and emotional well-being solutions. Such insights align with the feminist and STS perspectives, which advocate for understanding technology as embedded within social relations and cultural practices, encouraging a deeper appreciation of how these technologies facilitate connection, care, and resilience in communities in times of limited resources.

6.2.3. Alternative Energy Devices: Em-Powering Choices

In this section I shift the focus to the varied technological strategies employed—or notably, sometimes not employed—by urban residents to cope with power disruptions. Choosing these solutions not only powered their electronic devices but also empowered residents by helping them combat feelings of isolation and disconnection during power outages.

The decision of whether to use power banks, generators, and power stations was context-dependent and tailored to individual power needs. It has been influenced by several factors, including the ease of access to these technologies, their cost, the severity of power outages experienced by

each individual, the specific needs of residents or their communities, and a critical assessment of how sustainable these solutions are amidst unpredictable power cuts and blackouts.

6.2.3.1. Power in Pocket: Power Banks in Use

The adoption of power banks emerged as a common narrative among the urban residents interviewed. Many of them admitted the necessity of ensuring their electronic devices are charged, particularly during prolonged power outages that could last several days. Central to their coping mechanisms were power banks.

Portable battery packs were reported to be relatively easy to get in electronics stores, affordable and could charge small electronic devices like smartphones, tablets, and laptops (P8). Residents recall power banks to be “decent enough” and “generally sufficient” (P1) to meet their needs. For instance, a 10,000mAh power bank could fully charge a smartphone 2–3 times, whereas a 20,000mAh power bank could charge a smartphone 5–6 times or a laptop once. Nevertheless there were still certain limitations of their functionality for prolonged power cuts: as Participant 2 noted, even though they used a power bank, it could only last about four to six hours before needing a recharge.

Participant 7 recalled that local authorities recommended having power banks among other technological essentials, marking the devices as critical tools in preparedness for prolonged blackouts. Multiple residents articulated the need to have a power bank as self-sufficiency, emphasizing, they “had to have independent sources of energy, like power banks...” (P7, 329-330) to be able to charge their electronic gadgets at any time and independently from the power cuts schedule.

Sometimes, these basic energy storage devices would unexpectedly transform into gifts. Participant 6 shared a story recalling the adoption of power banks: when electricity disruptions began impacting their family, P6 felt a responsibility to support them in a meaningful way. About a week in, they decided to give their mother a power bank. They recalled it was a practical solution, but it also became a gesture of care and resilience. “It was the best gift for my mom in a long time,” P6 (116-117) noted with a smile as they recalled the feelings of gratitude of their family members when receiving the present. In this way, a simple technological device took on more than just a functional role; it acquired a social meaning as a source of care during times when independent power supply was essential. This is an example of how technology can become a means of care (Lindén & Lydahl, 2021), where even basic devices become symbols of support and resilience.

6.2.3.2. Generators: Why (Not)?

Unlike power banks, generators could provide a lot more power and ensure uninterrupted power supply for longer hours. The use of generators in the urban settings was multifaceted, encompassing a range of experiences from individual households to healthcare settings and businesses, each adopting different types of generators to navigate the challenges of the lack of electricity.

The way a generator works is transforming mechanical energy into electric one running on fuel like gas, gasoline or diesel. Depending on their size and type, generators were capable of delivering anywhere from 1,000 to over 20,000 watts of energy. For instance, a 5,000-watt generator could easily power essential appliances at home, like a refrigerator (which usually needs about 600 watts), a few LED-lights, and other gadgets. Some could run for about 8 to 12 hours at a moderate load, while larger ones could keep going for a full 24 hours.

These made them a go-to option for businesses like cafes, restaurants, and shopping malls that required reliable energy for longer periods. The residents recalled that during the toughest periods of blackouts, “generators were everywhere” (P3, 99-100) and there was a sort of an “obligation” every local business had to purchase a generator (P2, 282). As the generators were sold out in Ukraine, business quickly started purchasing the power units across Europe to maintain operations. Some participants also recalled the use of generators in larger business centers and offices. Participant 1 mentioned they had a generator and when “there was no electricity in the whole district, there were only lights in our business center...the only thing that saved us was a generator” (P1, 49). In this way, generators fulfilled a critical role of ensuring local businesses continuity.

In the healthcare sector, acquiring more powerful generators was a commitment to ensure uninterrupted medical services. P4, an assistant surgeon expressed their hospital's proactive stance: "We quickly resolved this issue by purchasing generators" The medical worker recalled, despite that the hospital was equipped with generators, they purchased more powerful stations to increase response capability and ensure the hospital's power needs are fully met, even during extensive outages. They also explained that if a power outage occurred during the operation, the equipment was connected to separate external Uninterrupted Power Supply (UPS) systems charged from generators in their medical facility. P5, another healthcare worker, expanded on this, noting the widespread use of UPS systems within leading medical institutions, which in emergency power cuts allowed “switch to autonomous mode” (P5, 10). Such preparedness measures enabled critical procedures, like surgeries, to continue without disruptions for some time.

During multiple conversations, the locals also recalled the buzzing sounds on the streets the generators produced while running, some residents described the sound bearing a symbolic meaning of the city's resilience to maintain its functionality despite blackouts. Participant 2 recalled that moment in their memory: "as I walked around the city, there was a real buzz on the streets from these generators..." (P2, 281-282). Multiple residents echoed these noise pollution sentiments, noting how the pervasive use of generators across Kyiv created a constant background noise. "This was also a very big problem, so indeed, you walk around Kyiv, and everywhere, generators were working, and you could hear them, the noise of the generators, as people tried to adapt and survive quickly" (P5, 60-61). Despite that the noise was an annoyance, it was also one of the numerous symbols of the adaptation process people had to undergo to maintain their daily lives amidst power disruptions.

The steady buzz and fumes of generators became a part of the city's fabric, transforming urban spaces into a kind of "cyborg city" (Swyngedouw, 2006; Gandy, 2015). Once just backup options, these devices now powered daily life, blending into the cityscape out of necessity. Their sounds and emissions reshaped the urban atmosphere, as residents had to adjust their routines and neighborhoods to include these makeshift power sources.

Notwithstanding the fact that local businesses relied on generators as a lifeline, adaptation of generators in home settings was less common. In a home setting, a generator could be a real lifesaver, however, using them at home, particularly in densely populated urban areas, was not always recommended, as they produce carbon monoxide (CO), which is dangerous if not properly vented. Placing the units outdoors was not straightforward either, especially in an urban setting where space is limited, and logistical challenges abound, like running power cables up to higher floors. Generators also produce much noise – "about 90 decibels" (P8, 228-229)— as loud as a lawn mower or a hair dryer, which made its usage quite annoying in a quiet neighborhood.

Despite less common use of generators in private housings, the locals mentioned the readiness of some people to use of power units in multi-storey buildings in spite of significant safety risks, including the danger of CO poisoning from generators operating indoors (P8) and the potential for explosions with low-quality generators "not designed to handle high voltages" (P2, 164). However, "some lessons or knowledge" (P2, 160) on how to implement these setups were required, which points to the complexity involved in utilizing these technological solutions in a safe and effective manner. Among 11 interviewees only one participant admitted using an old gasoline generator to power their private house on the suburbs of Kyiv. Despite its limitations, the old device significantly improved their power situation, recalling that

“for a full workday, it was enough” (P10, 183) and emphasizing the economic advantage of using a generator running on gas over petrol units.

Ultimately, the decision to purchase a generator or not depended not only on individual power needs but also on safety considerations and access. Some residents, like Participant 6, acknowledged they had adjusted their technological workarounds so that the purchase of a generator was an investment no longer required. Also the access to generators varied significantly across different socioeconomic groups, raising just questions of **affordability** and **availability** of alternative power technology. The residents perceived the prices for power units as unjustifiably high, acknowledging the generators cost “crazy money” (P7, 380-381) explaining skyrocketing prices due to the high demand (P8, 187). Financial strain has become a deterrent factor and made the pursuit of essential utilities like power devices tough for locals.

In the end, the ability to acquire generators was not just about individual choice but was deeply intertwined with socio-economic conditions, leaving many to question who truly could access and afford purchasing this technology and who was left behind and marginalized by inequality of alternative technology accessibility and distribution.

6.2.3.3. Portable and Green: Power Stations and Solar Panels

While generators have played a crucial role in coping with power outages, the challenges of using them—such as noise, fuel dependency, and safety concerns—have limited their effectiveness and sustainability as long-term solutions to power outages. From the outset, portable power stations (PPS) emerged as a more sustainable and indoor-friendly choice for many residents with many residents preferring them over generators in urban settings.

Portable power stations are essentially the same generators, but they are battery-powered and provide instant power without the same environmental or logistical concerns as compared to traditional generators running on gas or petrol. Among the most popular and most frequently referred to by the locals was the portable power station EcoFlow.

EcoFlow is a brand known for its portable power stations that use rechargeable LiFePO₄ (lithium ion phosphate) batteries to store and deliver electricity (EcoFlow, n.d.). Similar to a power bank but typically has a higher capacity and can power larger devices, making it suitable for camping, road trips, or emergency backup. The range of products spans from large home batteries, balcony solar systems and portable power stations for home and camping. The motto of the brand is: “Power Independence:

Empower your home with greener energy”, which speaks to the needs of the individuals who are affected by frequent power disruptions or simply want to ensure their independence from centralized electricity supply.

According to the EcoFlow, their power stations are quiet and produce minimal noise – around 30 decibels. Some of the power stations they produce can be charged from solar, usually they can be charged from the ordinary 220V outlet at home. Most desired ones were EcoFlow Delta series, the most featured model which could output up to 4kWh/4000W of power, which was enough to power most household appliances like refrigerator, use an electric cooker, turn the AC (heating mode during winter season) and use a few LED-lamps to illuminate the living space.

A number of residents noted they would like to purchase the Ecoflow power station as a backup power source to use during prolonged power outages. For instance, Participant 8 mentioned the quiet operation and convenience of bringing portable PPS indoors without the dangers associated with traditional fuel-run generators: “...without the noise from petrol generators, I can use the charged battery station at home” (P8, 193-194). Participant 5 reported successfully integrating EcoFlow for providing power for the Wi-Fi router at home to ensure stable internet connection necessary for maintaining daily life activities.

Some residents also mentioned their observation that their neighbors started purchasing portable solar panels. Those were placed on the balconies by individuals living on higher floors in multi-storey buildings. No special allowance from the local authorities was required to install them. Participant 8 noted that portable solar panels were “completely safe” (P8, 319) to use for urban dwellers even in dense residential settings, requiring only minimal knowledge and skills to utilize them.

Nevertheless, these portable power stations were not always enough when blackouts lasted several days in a row. As Participant 7 (149) pointed out, an EcoFlow battery needs roughly 5-7 hours to fully charge, which means there was a need for access to a power source for recharging the device—a requirement that sets it apart from traditional generators, which can immediately produce power from fuel. Nevertheless, it remained one of the best options: eco-friendly, sustainable, and capable of providing several hours of self-sufficiency during prolonged power cuts.

The question of access and affordability applied as much to portable power stations (PPS) as to generators. PPS units were also hard to find in local electronics stores; they often had to be ordered from abroad, with long waiting lists and wait times of several months. In a situation where electricity was

available in most city neighborhoods for only a few hours a day, this issue was particularly pressing. Prices were as high as demand, making PPS a desirable but unaffordable option for many locals.

The shift towards portable battery-powered stations and domestic solar systems reflected a growing preference for sustainability as well as demand for safer, more environmentally friendly power options during outages. This preference for greener solutions was driven by the clear downsides of using fuel-powered appliances in homes: the noise, the carbon monoxide smell—all factors that became evident as power was no longer supplied from distant sources but directly generated at home.

Unlike traditional power sources, which often remain out of sight on the city's periphery, the generators in the city became highly visible and audible symbols of fossil-fuel dependence. As many homes transformed into small power-generating domestic spaces, residents, faced with limited options, were reluctant to rely on fuel-based devices daily. Generators, while useful, began to take on the connotations of being 'dirty,' 'noisy,' 'clumsy,' and 'dangerous.' In contrast, battery-powered solutions like EcoFlow were perceived by the residents as 'cleaner,' 'quieter,' and 'safer' technological alternatives. A broader social narrative framing renewable energy as 'safer' and 'better' to use has been constructed on a broader collective level and has become "the talk of the town".

However, this spirit of resilience and technological adaptability did not stop at commercially available solutions; it also included creating inventive DIY solutions for maintaining independent power supply to ensure connectivity and essential activities.

6.2.4. From Tech to Tinkering: DIY-Solutions at Home

Often, in the black-out-strewn streets of Kyiv, the locals' ingenuity has turned ordinary automotive (car) batteries and household items into invaluable alternative sources of energy. This practice of bricolage, in the words of Bijker et al. (2014, p. 57), "emphasizes the positive aspect of vulnerability through flexibility and improvisation". Through this perspective vulnerability can be reconsidered not merely as a condition of risk exposure but as a catalyst for innovation and adaptability.

Vale & Campanella (2005) perceive disasters as "engines of improvement" in recovering communities. In fact, the "narrative imagination" allows disaster-stricken communities to effectively translate their experiences into stories of overcoming and adaptation; thus, their zones of suffering metamorphose into cultural and communal construction sites.

These adaptations were not only for survival but also exhibited how people were deeply

connected with the environment, materially and socially, by experimenting and improvising to find simple and effective solutions to manage through infrastructural breakdowns and frequent blackouts. As mentioned above, an example of self-em-powerment retold by the locals was the reuse of automotive batteries as a source of autonomic energy in domestic spaces.

One of the stories that really stood out was the conversion of the car battery into a power source, as narrated by some of the participants. As mentioned in the sections earlier, the concept of *jugaad*, similar to *bricolage*, consists of using creativity and innovation to find rapid and ingenious solutions, in particular in restricted environments. Herein lies an approach vividly demonstrated by participants such as P8 and P3 who are proud, developed, and have overcome.

The adaptation strategies using automotive batteries and inverters fitted neatly within the constraints of urban apartment living in Kyiv, where installing conventional generators powered by diesel, gasoline, or gas could be problematic. P3, who first brought up this technique, and P8, who provided the most detailed explanation, highlighted how these systems cater to those who might find commercial portable charging stations cost-prohibitive.

Participant 8 recalled leveraging technical skills to construct an autonomous power supply using a simple car battery and inverter. This setup exemplified the principle of converting DC voltage (12 or 24 volts) from the battery into AC voltage (230 volts) at 50 Hz, making it possible to power household devices directly from the car battery. Background knowledge in physics allowed for transforming a car battery into a source of electricity for home: “...I took a car battery, added an inverter to it, and managed at least to turn on the lights at home.” (P8, 17-18)

Participant 7 has called this makeshift solution “a homemade power kit that runs off a car battery” (P7, 93-94), which is basically a setup that uses a power inverter to transform the car battery’s output into usable electricity, enabling the use of basic household items like LED-lamps during outages. Similarly, Participant 3 recalled their experience of using automotive batteries as a backup power source and for recharging the batteries of a portable power supply station.

Further, P8 shared how this setup extended beyond just lighting, enhancing overall convenience within his living space: “I could charge devices and use a few outlets at home. It was convenient.” (P8, 29).

During the interview, P8 was meticulous in explaining the operational aspects and safety precautions necessary for such setups. Key among these was the proper sequence of connecting the

inverter to the battery and then to the appliances to avoid damaging the inverter or causing electrical hazards. They emphasized the importance of polarity when connecting the clamps to the battery terminals, warning that a mix-up could trigger the system's protection mechanism and necessitate a fuse replacement.

The resident also shared practical tips on managing the power load to ensure the inverter's efficiency. By calculating the total power needed for various devices—like two laptops (300 watts), a router (15 watts), an optical network unit (ONU) for fiber optic cable (15 watts), and several light bulbs (20 watts) totaling 350 watts—they demonstrated how a 400-watt inverter could efficiently meet these needs with a 15% power reserve.

$$300 \text{ (laptops)} + 15 \text{ (router)} + 15 \text{ (ONU)} + 20 \text{ (light bulbs)} = 350 \text{ watts}$$

$$\text{Reserve} = 400 \text{ watts} - 350 \text{ watts} = 50 \text{ watts}$$

This reserve helps in ensuring that the inverter is not operating at its maximum capacity all the time, which can extend its life and improve performance.

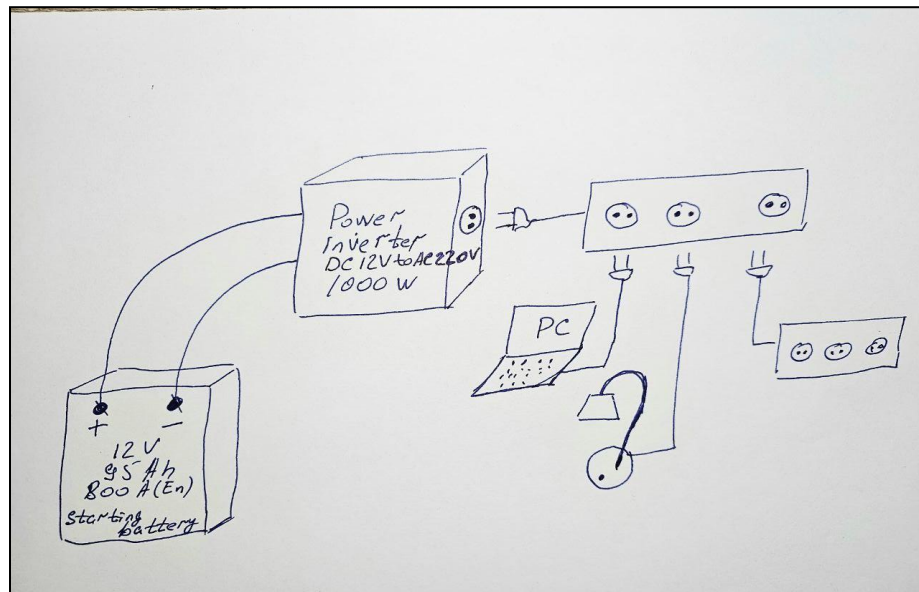


Figure 2. Hand-drawn Setup-Scheme of an Autonomous Energy Supply System Using a Car Battery and an Inverter

Here is a hand-drawn schematic (sketched by P8 during the interview) representing the setup of an autonomous energy supply system using a car battery and an inverter. Here is the description of the scheme:

Automotive battery is labeled with “+12V” indicating its voltage and is depicted as a block with two terminals (+ and -). This serves as the energy storage component in the system. Power inverter is shown connected to the battery. It is marked with its output specifications, “220V AC, 1000W,” indicating it converts the DC (Direct Current) power from the battery into AC (Alternating Current) power, up to a load of 1000 watts. The power inverter feeds into a power strip or a multi-socket extension, where multiple devices can be plugged in. The devices represented include a PC (Personal Computer) and some light fixtures. There are additional outlets available, suggesting that more devices can be connected as long as the total load does not exceed the inverter’s capacity. The battery and the inverter are connected with thick lines, meaning cables, and the connections are made using what are referred to as “crocodile clips” or clamps. It is important to connect the polarities correctly to avoid triggering the inverter’s safety system and blowing a fuse.



Figure 3. Setup of an Autonomous Energy Supply System Using a Car Battery and Inverter

The figure above (a picture of how the setup looked in real life I took by P8) illustrates how this autonomous electricity supply system was used in case of a blackout. It includes a car battery connected with an inverter-a device that converts DC from the battery into AC suitable for powering household

devices. A charger is also included for restoring the battery upon restoration of electric power.

In the context of the given scenario, such pragmatic small-scale tinkering solutions were some of the instances of tinkering and bricolage that residents had adopted to maintain basic functionality during disruptions of power. The narrative of DIY solutions using automotive batteries has often sparked a sense of pride for those who successfully implemented it, making most of the resources available. This knowledge transfer was facilitated by the internet, allowing easy access to schematic diagrams and power calculations.

In the same vein of resourcefulness demonstrated by using automotive batteries, Participant 10 shared a transformational approach to managing energy costs during prolonged outages. Initially, P10 and their family invested in a new petrol generator as a more robust solution to their power needs in a private house on the outskirts of the city. The generator was capable of powering essential household utilities including the refrigerator, heating, internet, and water systems.

However, the economic burden of running the generator on petrol during these demanding times prompted an innovative modification. Understanding the high cost and inefficiency of petrol, they opted to convert the generator to run on gas, which was more economically viable and readily available through the existing infrastructure. The resident recalled purchasing a “kit that helps convert it [generator] to gas”. The conversion process was a collective family effort, with P10 crediting their father’s expertise: “My dad, he has what you might call golden hands. He can do anything, so he helped a lot” (P10, 275-276).

Tinkering (in this case experimenting and redesigning of a generator device) not only alleviated the financial strain of operating a generator during extended periods of power cuts but also exemplified the broader ingenuity of experimenting with the already existing technological appliances and tailoring them to their needs.

The narratives of DIY solutions reveal participants’ creative and practical responses to power outages, describing the tailored methods of adjusting alternative technologies to maintain their lives as close to normal as possible. The ways the residents adapted—repurposing car batteries and customizing power stations to meet their own needs—echo the necessity of local knowledge and tailored solutions to meet individual needs also seen in the story of the Zimbabwe Bush Pump (de Laet & Mol, 2000).

It was also a story of how experimenting was a manifestation of care and resilience: caring for family members by ensuring warmth and connectivity, caring for neighbors by sharing knowledge about makeshift solutions, and caring for oneself through the reassurance of power resilience in uncertain times.

This improvisation was not just technical—it was deeply relational, with each small adaptation serving as a small victory.

In the end, coping mechanisms employed by the residents to manage power outages were tactical and ad-hoc rather than strategic (Certeau, 1988). There was no standardized or universal solution for which technological devices worked best – no one-size-fits-all approach; their use depended on individual needs and localized contexts. Though common narratives and success stories circulated about which technologies or methods proved most effective, ultimately, there was multiplicity in adaptation experiences, each of them unique.

The adaptations also reflected inequalities in socioeconomic conditions, as not everyone could afford high-end power stations or generators, especially within the larger wartime context. This disparity in technological adaptations also highlighted differences in knowledge and skills as not everybody possessed the expertise or resources to repurpose or innovate with what was at hand.

Nevertheless most of the residents interviewed reported effectively “arming” themselves with alternative technological devices, which became essential tools in building their resilience. These DIY solutions and alternative technologies were more than practical responses.

Urban resilience was essentially constructed by a bottom-up approach, beginning from constructing resilient urban households. Individual resilience has contributed to the formation of a broader techno-culture and politics of resilience, eventually leading to the construction of the identity of a resilient citizen in social, emotional, and techno-political dimension.

In this case, resilience (and its dimensions – urban, social, technological, political, national) was not merely a socio-political construct but also one of technological adaptation, each reinforcing and sustaining the other.

6.3. Enacting Emotional Resilience

“You can survive it even if you’re not ready for it... yes, you can.”

– P7 (399) during the Interview on June 17, 2023

The unexpected loss of power infrastructure in a major urban area during winter brought immediate shock, fear, and frustration to its residents. The emotional responses triggered by this multi-faceted crisis reflect the broader psychological impact of power outages and the evolving emotional

resilience of urban residents as they began to accept and normalize the difficult situation.

This evolving emotional landscape was evident during the interviews, as residents described and showed their emotions while reflecting on challenges or sharing stories of successful adaptations to blackouts. The narratives were often structured to begin with the initial difficulties and then shifted toward how they eventually overcame them in the form of problem–solution.

Emotional resilience was also expressed in the interviews themselves as most participants remained calm (sometimes even sarcastic) while recounting their experiences, and some even made lighthearted jokes recalling some of their experiences—a resilience mechanism some of the residents used to reflect on the difficulties of adaptation process, especially given the broader socio-political context of war.

In this process, technological adjustments to prolonged power outages served as a driver and enactment of emotional resilience, making the overall experience of blackouts less emotionally stressful for the local population.

6.3.1. First Responses: Shock, Fear, Frustration

Despite the emotional stoicism the residents showed while retelling the blackout survival stories, the onset of infrastructure breakdowns was characterized by shock, fear, and frustration. These emotional responses echoed across the narratives as the residents reflected on their initial reactions to targeted infrastructural breakdowns and blackouts.

One participant described the initial moments as “weird” (P1, 287) and “terrifyingly scary” (P5, 62), recalling the strangeness of the situation which rendered even familiar surroundings alien. The intersection of the Covid-19 pandemic with the blackout intensified the emotional strain on residents. Recalling the emotional difficulties of surviving blackouts, the locals mentioned the compounded toll: restricted movement, remote work pressures, and the ever-present threat of military conflict, creating an atmosphere far from “a joyful one” (P8, 143). These reflections underscore the heightened psychological burden of navigating multiple vulnerabilities at once.

Another participant described the transformation of the city’s landscape at night as turning into a “black hole,” using a metaphor that conveys the depth of the darkness and the profound sense of isolation it triggered (P5, 52). The challenge, however, was not just the darkness but also the harsh winter conditions, which exacerbated the feelings of vulnerability and discomfort. Participants recalled “only a

couple of hours of daylight” in winter period (P1, 171) adding the challenge of darkness posed by the season, which has exacerbated emotional challenges of living in the dark. This lack of natural light further strained the residents’ ability to maintain normalcy and mental well-being.

As days turned into weeks, the residents reflected on gradually adapting to the prolonged loss of power. For instance, Participant 2 discussed the resilience demonstrated by an elderly family member, contrasting it with their own struggles compound with the necessity to care for the elderly relative during blackouts: “Had I lived alone, it would have been easier, but I have an elderly relative with me, my grandmother... It was hard for her, of course, but she adapted, perhaps, even faster than I did” (P2, 253-254; P2, 257-258). This adaptation of the elderly relative was attributed by the participant to a lifetime of overcoming adversities, including WW2 experiences and previous societal hardships.

Similar emotional strain of care was mentioned by P3 stating “sometimes I worry more about my parents, like... there is nowhere safe” (P4, 140).

In such narratives, care emerges as a complex and, at times, burdensome commitment. The experience of taking care for the elderly relative as a moral obligation (Martin et al., 2015, p. 627) highlights the “darker side of care” (Martin et al., 2015, p. 627; Lindén and Lydahl, 2021, p. 4), where ensuring a loved one’s well-being amid disruptions becomes emotionally and physically challenging, especially during crises like blackouts.

The historical resilience of senior residents became particularly evident in some other narratives as well. For example, Participant 9 recalled the similar experience in the post-WW2 era: “This experience reminded me of the post-war times as I was in evacuation. I returned from evacuation in 1943, maybe 1944. Electricity came back to our small village in 1947 or 1948. Before electricity was restored, I remember we used kerosene lamps”.

Such narratives offer insight into how past experiences, knowledge and embodied practices shape present-day technological and emotional resilience in the form of adaptations to blackouts. The memory of using kerosene lamps in the post-WW2 period reflects a form of “local knowledges” rooted in prior crises, which equipped senior residents with an adaptability to the current power outages. In absence of modern conveniences older, more manual forms of technology and emotional protection mechanisms have been reactivated. Over time, past survival experiences, knowledge and skills have become relevant in contemporary crises and can be passed down to (future) generations in the same way.

P8 also recalled their observations on varying individual and societal adaptation, noting that in the

face of adversity some individuals “have lost their heart, whereas some, on the contrary, plucked their spirits up” (P8, 165-166). During any traumatic societal event, resilience levels vary among individuals, with some showing greater adaptability than others (Vale and Campanella, 2005). While the initial shock is nearly universal, the subsequent emotional journey can vary significantly among the locals.

Moving forward, I will explore the ways that individuals adopted to maintain emotional well-being amid such multi-faced challenges.

6.3.2. Emotional Care Tactics

Amidst the challenges posed by power cuts and blackouts due to targeted damage to energy infrastructure of Ukraine, the residents of Kyiv demonstrated remarkable emotional resilience. At the time of the fieldwork, shops and cafes remained open, with people striving to smile and maintain a sense of normalcy in their daily lives. There was a collective effort to reassure one another that everything would be alright, emphasizing that the difficulties were temporary and would eventually pass.

Throughout the interviews, there was also a recurring tendency of normalizing the abnormal events – also as a coping mechanism of acceptance and adaptation to the new reality. Reflecting on the tough times, the residents attempted to assign the meaning to the adverse events as the “lessons learned” and an experience which made them more resilient to future blackouts (and not only).

This adaptation extended beyond mere technological solutions, touching the core human needs for stability, certainty, and safety. Although alternative technologies have played a role in coping, they could not completely substitute for these basic needs. However, in some instances, technological adaptations have facilitated an emotional adjustment to living off the grid, offering a new dimension to resilience.

6.3.2.1. Acceptance and Normalization

Acceptance and normalization of the situation were the first steps that the residents have undergone to emotionally adapt to the dark times. Kornberger et al. (2019, p. 34), nevertheless, note that the gradual acceptance and normalization of abnormal occurrences can complicate the sensemaking process, as the sensemakers can rely on the overarching collective knowledge frameworks to interpret the experiences. As the locals have gradually adapted to frequent blackouts, their perceptions of normality shifted.

Participants reflected that over time they got used to the conditions of power outages, recalling the situations where the previously “normal” things such as uninterrupted centralized power supply was perceived as “abnormal” phenomenon:

“People have become so accustomed to these conditions... I remember after those power outages, we would call each other and say, ‘Can you believe it’ The electricity is back!’ And everyone would react like, ‘Wow, amazing!’ [laughs] It was just so surreal because everyone had become so accustomed to these blackouts that when the power came back, everyone expected there to be a catch. People couldn’t perceive it as something normal, as if it was too good to be true.” (P1, 189-192)

This remark by Participant 6 (49-50)—“...we approached it with enthusiasm: yes, these are difficulties, but we have to adapt; adapt or 'die,' something like that”—illustrates how adaptability as a survival mechanism has shifted resilience from a passive endurance of blackouts to an active, almost “mandatory”, form of agency, framing adaptation as essential to maintain the living as close to the normal as possible.

Here, acceptance and normalization have become not a passive response to crisis but a continually reinforced, collective identity. The process of technological adaptability, thus, has been kicked off by normalization and acceptance of the power cuts as daily routines, which has also become integral to how residents viewed their role in coping with blackouts in urban environments.

6.3.2.2. Comparative Coping

The use of comparative mechanisms has also played a significant role in emotional coping.

The residents often recalled prioritizing stressors, positioning the blackout as “not the scariest thing” (P5, 96) within a hierarchy of threats, by framing power outages as secondary to the risks of bombardment and loss of “the loved ones” (P5, 97). Likewise, some locals compared the blackouts as “just a drop in the ocean” (P1, 203), framing the outages as trivial in contrast to the sacrifices of those on the front lines. Such responses illustrate the tendency to contextualize stress within the broader, more severe risks of war. Enacting emotional resilience here was not merely about enduring the blackout but also about mentally fixing it as a less significant concern compared to existential threats.

In reflecting on coping mechanisms, participants often expressed gratitude and admiration for the emergency services, portraying their efforts as heroic acts. Participant 6 described the rapid repairs of power infrastructure, even in challenging conditions, as “impressive,” highlighting a collective respect for

these workers. Others similarly acknowledged the “heroic” labor of energy workers, emphasizing the high-risk conditions under which these repairs were made.

These reflections align with Bruner’s (2004, p. 694) view that narratives are embedded within cultural processes, where certain figures or groups assume a “heroic” role in times of crisis. By elevating the efforts of utility workers to a near-mythic status, participants interpreted these events as folktales of communal endurance and recovery. This heroization of emergency services reflects a social process of creating resilience narratives that construct communal resilience identity and value those who protect and sustain essential infrastructure.

Participant 3 also recounted a friend’s survival of a sniper injury. With a smile, P3 shared, “I don’t know, you get used to even such crazy situations. Well, not really crazy situations...”, proceeding to recounting the tale of a friend’s resilience: “Because my friend came back from the front, he got shot in the face by a sniper, it went through his cheek and didn’t hit any vital organs too badly, although it hit his face, and he recovered and went back. Can you imagine?...” (P3, 199-201)

These reflections underscore extreme adversity can recalibrate personal discomforts. Ultimately, infrastructure breakdowns and blackouts have become psychologically manageable when integrated into a larger narrative of resilience amidst ongoing conflict.

6.3.2.3. Humor as Healing

A salient coping mechanism, humor has also provided much-needed relief and fostering a sense of community among affected individuals. It was visible in both what the participants narrated as well as how they actually reflected on their experiences.

For example, Participant 6’s story about learning to cook on a portable camping gas stove brought humor into the conversation. “No, no. It wasn’t very difficult. I am generally a bad cook in everyday life, and nothing has changed there,” P6 (86-87) recalled smiling, effortlessly lightening the mood of the conversation.

Residents’ memories illustrate how humor became integrated into daily life and even public discourse, recalling the blackouts “very quickly became a subject for jokes” and “a part of culture the moment one could joke about it” (P6, 122). Participant 2 also highlighted the role of humor in various societal discourses of coping with the absence of power: “Of course, there were all sorts of jokes and

memes about it. It couldn't be otherwise" (P2, 222) This normalization of the situation through humor, lightened the mood, making the adversity bearable and even a point of social bonding.

Despite the difficulties, some cultural events and performances continued, serving as a way to uplift spirits and maintain a connection to community identity. In the course of the fieldwork I attended a local stand-up comedy show held in a cellar for safety reasons, as it could also serve as a shelter. During the performance, the comedians made jokes about often "clumsy" and "funny" ways the residents (including themselves) adapted to cope with the power outages, highlighting the inventive yet often humorous DIY-solutions the locals devised.

In this way, emotional adaptation also encompassed a story of cultural adaptation through the means of art, as the stand-up performance provided a platform for residents to confront their challenges with jokes.

6.3.2.4. "Against All Hope, I Hope"⁷

The expectancy of "waiting for the lights to come back" (P3, 35) suggests that, beyond simply adapting to the circumstances, locals held onto a vision of normalcy returning. The anticipation of restored power offered the locals a significant emotional anchor. This forward-looking hope provided a counterbalance to the challenges of technological adaptations; while power banks, flashlights and portable generators offered temporary relief, they were perceived by the residents more as a stopgap than a true replacement.

There was also a common narrative throughout the blackout resilience stories: reflection on the arrival of spring. The anticipation of spring offered more than just hope for an end to the power cuts; it carried symbolic meaning of renewal, a promise of brighter days—again, both literally and symbolically.

Participant 8 saw spring as a season of natural relief, saying, "spring (itself) is a time of rebirth, that is, the night gets shorter, and the day gets longer, so you need less – less time when it's dark and you have to switch on the light" (P8, 211-213). For some, the arrival of spring also carried practical promise, such as the boost in energy from natural sources, as P2 added, "I was just waiting for it to end, waiting for spring to come... more electricity produced from water, sun, wind, more from alternative energy sources" (P2, 203-204).

⁷Ukraïinka, L. (1890). *Contra spem spero!* [eng. Against all Hope, I Hope]

This anticipation of spring and the power of natural renewal aligns with the concept of prospective sensemaking, as described by Kornberger et al. (2019) and Maitlis and Christianson (2014). Here, residents not only anticipated a future where power outages would end but actively constructed their understanding of the present through this expectation. By looking ahead to the brighter, longer days of spring and the potential for alternative energy sources, participants engaged in a forward-looking process that helped them frame their current struggles as temporary and manageable.

Bijker et al. (2014, p. 226) call these survivors' experiences "counternarratives", using which the narrators often downplay or dismiss their struggles in favor of restoring "normalcy". In doing so, the overarching collective narrative or idiom "we must move on" (Bijker et al., 2014, p. 226, see also Hilgartner, 2007, p. 155) is embedded and constantly circulated throughout the affected communities.



*Figure 4. MATA RUDA (Karl Miller Espinosa).
"Contra spem spero!" (eng. "Against all Hope I
Hope") (2017)*



*Figure 5. Julien Mallan and Oleksiy Kyslov.
"Revival" (2014)*

Street art and graffiti expressing messages of hope and resilience were present throughout the city, indicating a collective desire to inspire and uplift one another. Indeed, some of these murals and street art pieces were created prior to 2022, reflecting the values of cultural identity, and also ecological awareness. These artworks, which gained new symbolic meaning in the context of recent challenges, now served as both cultural artifacts and symbols of hope for the locals.

Ultimately, hope and adaptation coexisted but with a clear preference for an eventual end to the blackouts, where technology could once again recede into the invisible background of urban life rather than dictate it. The process of sensemaking included not only adapting to immediate difficulties of blackouts amidst the broader context of war; it allowed the locals to construct a narrative (both on individual and collective levels) in which seasonal changes would ease their burdens, creating a form of hope grounded in observable events. Anticipation, thus, has become part of a collective and future-oriented approach to resilience and adaptation.

Transitioning from the examination of emotional resilience, I now delve into reflections about the experiences and “lessons learned” by the residents during the blackouts. The focus will shift to discussing the identity of a resilient citizen and the notion of “preparedness”.

6.3.3. Prepared for Any-Thing

“I just always believed that we [the people] could endure and even solve the problem with the power outages, which we effectively did.” (P1, 214-215)

The stories of technological and emotional adaptations to blackouts highlight the broader themes of preparedness and adaptation on both individual and collective level, resonating with the concept of “urban resilience” as explored by Vale & Campanella (2005). This term encapsulates the profound human capacity to adapt and find comfort amidst adversity. The “narratives of resilience”, are defined as “constructed collective voices that expose a longing to render tragedy in uplifting terms or to append a spiritual or faith-based element to the suffering hand” (Vale & Campanella, 2005).

It was nevertheless a unique interpretation of resilience, articulated by each resident I have spoken with. For some, it manifested through practical adaptations, such as DIY technological solutions to cope with power outages. Others defined resilience in more emotional terms, finding solace in seemingly trivial details that reaffirmed the continuity of life, even in challenging circumstances.

One urban resident, born in 1940, illustrated this notion through their experience of sitting by a window during a blackout. This moment offered a sense of serenity amidst chaos; the café visible from their window, filled with people charging their devices and sharing space, served as a poignant symbol of normalcy against the darkness. They reflected, “Seeing those little lights made me feel calm, knowing that life was still happening somewhere. It was comforting to see cars passing by with their headlights on amidst the darkness” (P9, phone interview, 16.07.2023).

Preparedness (Tironi et al., 2014) emerged as a central theme in many residents' narratives about empowerment gained during surviving blackouts. Participant 8 articulated the satisfaction derived from problem-solving during outages, highlighting how the experience fostered joy through small victories, such as maintaining utility access during prolonged power cuts. This suggests that preparedness not only alleviated the practical challenges posed by disruptions but also enhanced psychological well-being by fostering a sense of control over uncertainties: "I'm prepared, I'm good" (P8, 153).

Similarly, another resident observed the community's evolving adaptability to power outages, humorously noting that locals have developed strategies for coping with disruptions: "If there are minimal outages, I believe people already know what to do, how to survive in such conditions" (P1). This reflects a broader cultural shift toward collective resilience and self-sustainability, as the urban populace attempts to reduce their vulnerabilities linked to infrastructure dependence.

In socio-technical sense, preparedness for blackouts extended beyond technical solutions to encompass emotional readiness. Despite being tired of having to both technically and emotionally navigate their lives amidst blackouts and war, the residents often highlighted the autonomy and independence gained from maintaining alternative power sources: "different things can happen... Let it [alternative power sources] be. It doesn't ask for food" (P8, 336-337). The mention of folk proverbs, such as "As they say, in July your sledge remember" (P8, 34-35), reinforces the practical wisdom of anticipating needs before emergencies arise. This practical preparedness is mirrored in Participant 1's decision to keep traditional cooking methods, like an old kettle and a gas camping stove "just in case" (P1, 297). Such choices reflect a broader perception of preparedness not merely as a technological one, but as an essential ingredient in the emotional resilience of the citizens, equipping them to navigate uncertainty with confidence using alternative power supply devices.

Some of the residents recognized their unpreparedness amidst modern conveniences. As Participant 3 (252-253) put it, "You just realize that you are an urban person, not adapted to such extreme conditions". For many urban dwellers, surviving the blackouts in urban environments has prompted a reevaluation of their relationship with both infrastructure and the space around them. People found themselves reevaluating their reliance on technology, with a growing awareness that true resilience often requires skills beyond what urban life typically offers.

In the end, the identity of a socio-technically resilient citizen emerged. Within this localized context, echoing Haraway's (1988) notion of situated knowledges, it encompassed not just essential

technological devices the locals used to navigate blackouts but also the emotional preparedness to resist the challenges and care for themselves and others in times of crisis.

6.4. A Moment of Unity

“It turns out that people aren’t as indifferent as you might think.” (P3, 68-69)

The identity of a resilient citizen was socially constructed within a broader narrative of resilience enacted at the community level. This narrative of a “resilient nation” often implicitly assumed that locals—regardless of socio-economic status, profession, or lifestyle—would unite and support one another. In Kyiv, this expectation was particularly strong, reflecting the view that as long as the capital continued to function, the state itself persisted. This created an implicit standard: only resilient (to blackouts and war) citizens could truly embody life in a capital symbolizing freedom and resilience.

In interviews, participants recounted how they and their neighbors adapted and supported each other during times of need. Community responses varied, from spontaneous neighborly aid to more organized grassroots initiatives, mobilizing resources and providing care, especially amid power blackouts.

The moment of unity was nevertheless a temporary phenomenon, with the locals often mentioning frustration and the strong desire for fairness in trying circumstances. It was particularly evident in the situations when some of the residential buildings on the line with critical infrastructure remained to be powered whereas there was no electricity in the neighboring houses.

A significant aspect of community dynamics during times of crisis revealed—while solidarity can lead to shared solutions and mutual support, disparities in resources or perceptions of inequality can also lead to conflict and demands for the equalization of hardships, particularly when resources are scarce, and not everyone’s needs are met in the same way.

Despite the annoyance and frustration with unequal vulnerability to power cuts and blackouts, sometimes the residents reflected on their experience of coping with the loss of power with a light smile on their faces, recalling the stories of being offered external support from other people they needed during the blackouts.

6.4.1. A Hand of Help: Community Support

The narratives of participants illustrate a socially constructed resilience where communal support and proactive adaptability became essential components of blackout survival. For instance, participants mentioned the rapid sharing of “life hacks” (P5, 85). The dissemination of knowledge on how to remain self-sufficient during the blackouts was a response to urban vulnerabilities. In that sense, resilience has been enacted not merely on an individual endeavor but has become a socially embedded practice, fostering interdependence from centralized power supply infrastructures among residents.

Similarly, Participant 6's retold the broader narrative on proactive response to power outages—“adapt, complain less, and do more (...) help others, help ourselves, be as productive as possible” (P6, 66-68). This reflection aligned with a socially-constructed ideal of resilient citizenship, where its meaning often lied in mutual aid and remaining productive despite the challenges of power outages and the broader socio-political context of war.

The responses to power outages further illustrate this collective resilience. As P7 and P8 detailed, neighbors pooled resources to secure shared power sources. Ensuring the residential building has supplementary technology to have light, heating and water became collective priorities. The pooling of funds and resources for shared generators was an example thereof.

Even workplaces became informal hubs of resource-sharing, constructing the broader techno-political culture of resource-sharing. This “moment of unity” (P1, 246), though temporary, contributed to the formation of a shared identity rooted in mutual care and solidarity.

Amid these larger cultures of knowledge (how to survive blackouts) and resource-sharing (of essential technological devices to ensure power and connection), individual acts of kindness also played a crucial role in building community resilience.

Participant 3 recounted a personal story of neighborly assistance during a crucial academic moment: “I visited him [the neighbor]. I remember I had a final exam, yes, it was an important one. And these neighbors were always helping me out. He [the neighbor] extended a construction cable with an outlet into my apartment. They had some kind of a power station, and it lasted even a whole day with electricity. They had lighting as well. I visited them once and even took my online exam there.” Such gestures of neighborly support highlight the immediate, practical assistance that emerged during times of need.

One grassroots initiative that emerged was the creation of “**aid boxes**” (скринька допомоги), essentially community care kits placed in the corners of elevators and common areas of residential buildings. These boxes were stocked with essentials—water, non-perishable food, flashlights, and occasionally basic first-aid supplies—designed to provide immediate assistance to anyone who might be stuck during a power outage.

The aid boxes also served as physical symbols of resilience, as they were voluntarily stocked and maintained by residents. Items, including water bottles, snacks, napkins, and even seating arrangements, were provided by resident initiative groups. Although these supplies were used only when necessary. With the situation with the blackouts getting better in the next years, the aid boxes in the elevators were no longer as regularly maintained as there were during the severe power cuts.

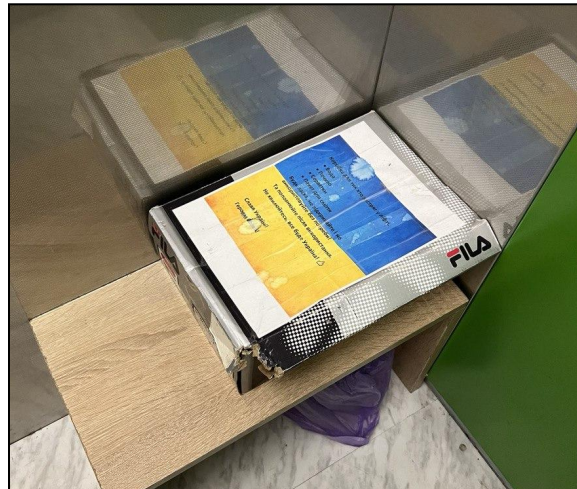


Figure 6. Aid Box inside the elevator in one of the residential buildings

The participants noted that such collective informal grassroots initiatives were often temporary. Participant 3 reflected, the challenges of overcoming blackouts “brought people together, but eventually, everyone went back to their own routines... Some things bring people closer when help is needed, but it’s temporary” (P3, 67-68). In times of crisis, solidarity often emerges but tends to be temporary in nature.

Grassroot initiatives were also directed at devising innovative ways to navigate the disruptions caused by power outages, utilizing technology to stay informed and connected. One such tool was the SvitloBot⁸, (in English – “**LightBot**”), a Telegram-based chatbot that became a crucial informational

⁸ Retrieved on November 1, 2024 from <https://svitlobot.in.ua/#>

resource during the power crises.

SvitloBot was created by a group of students from the Lyceum “Naukova Zmina” (in English – “Scientific Change”) in Kyiv. It functioned as well in many other localities in Ukraine, by using old or unused smartphones or tablets plugged into power outlets.

Participant 10 explained the principle of its operation. The SvitloBot functions as a Telegram-based chatbot that provides real-time notifications regarding the status of electricity supply. The bot is linked to old or unused smartphones or tablets, which are continuously charged and plugged into power outlets. As long as the device is receiving electricity, it remains operational, indicating that power is available. If there is a power outage and the device stops charging, the bot automatically triggers a notification to its Telegram channel subscribers, informing them of the electricity loss. A detailed scheme of the SvitloBot operation can be found in the Appendixes.

The simple, yet effective, warning system allowed its users to receive timely updates about their power status, functioning as an early warning mechanism. It also helped urban residents plan their daily activities—like when to cook, charge devices, or schedule work—by providing real-time information on whether power is available in their homes or offices.

The simplicity of the SvitloBot serves as one of the examples of grassroots tinkering and bricolage, aligning with the broader techno-political culture of knowledge- and resource-sharing, where technical ingenuity and local knowledge are used to provide innovative solutions without requiring large-scale or formal resources. Existing infrastructures (such as social media Telegram) and available resources (such as old phones, tablets and similar devices) can be creatively repurposed to address pressing community needs of keeping informed about the situation with power at any time. This became particularly useful during unpredictable power cuts, helping urban residents manage their daily activities and prepare for possible outages.

6.4.2. Points of Invincibility

In November 2022, against the backdrop of intense shelling that disrupted critical infrastructure during the ongoing hostilities, the Ukrainian government initiated a social project known as “Points of Invincibility” (Punkty Nezlamnosti, пункти незламності), in cooperation with regional authorities and the State Emergency Service (SES).

These facilities were established as free support hubs designed to offer safety, warmth, and unity during extended power outages, a concept defined by the Ministry of Internal Affairs as creating “an island of safety, stability, warmth, and unity” (Ministry of Internal Affairs of Ukraine, 2023) (see the map of the hubs in Appendixes). As reported, around thirteen thousand “special rescue centers” (P5, 37) were rolled up in Ukraine (the occupied territories not included), however there is no official statistics on how many residents have actually visited them.

Usually the support spaces were equipped with robust generator or power station systems, which allowed them to offer power services independently, enhancing the network of support available to the public. Typically, these centers could accommodate between 40 to 500 individuals at a time, serving not only as physical space for refuge but also as a symbol of resilience and communal solidarity.

Located in schools, government buildings, and local administration offices, and responsible businesses, these hubs and sometimes emergency tents were equipped to provide essential services including heating, water, lighting, mobile communication, internet access, charging stations for mobile devices, resting areas, and special provisions for mothers and children.

Participant 3 recalled, “Points were set up in some schools, with signs indicating their locations. You could go there to charge your phone; everything was operational for those studying. Schoolchildren were reading their books there, and there were hot drinks available. Some people might have needed medical assistance, and there was basic electricity and lighting, so no one was sitting in complete darkness” (P3, 115-119).

What made these points particularly unique was the blending of formal government support with informal community engagement. Unlike coffee shops, shopping malls, and restaurants, points of invincibility offered alternative spaces, where the residents could use uninterrupted power supply free of charge. The existence of these points also illustrates how space is negotiated in times of crisis. Unlike commercial spaces, the Points of Invincibility prioritized community needs over profit. The role of public spaces can be reinterpreted as resource-hubs during emergency situations.

Urban residents provided varied insights into their experiences and the functionality of these Points of Invincibility. Some described these spaces: “there is always access to light and the Internet, and it also serves as a place to heat during the cold times of the day” (P4, 151-152), noting the availability of essential services like hot food, a place to charge electronics, and internet access. However, others pointed

out issues such as overcrowding and the sporadic functionality of the services, which sometimes lessened their effectiveness.

The concept of Points of Invincibility emerged in alignace with the broader resource-sharing culture during power outages. The emergency power hubs served not only as shelters but also as functional spaces for community engagement. The residents recalled the role of the spaces to recharge devices, and access essential services, such as light and internet connectivity. Such simple services facilitated a semblance of normalcy amidst blackouts. The hubs also served as crucial workspaces for individuals lacking private power supply sources (like generators and power stations).

However, the socio-economic dimensions of these points also questioned resource accessibility. Participant 8 highlighted that Points of Invincibility were particularly critical for those unable to afford or utilize personal power solutions, such as generators or power stations. In that regard, the emergency tents were important for vulnerable populations, especially the elderly and those lacking the skills or resources to manage personal power alternatives. This reliance on communal resources reflects broader inequalities during crises, as individuals with means often coped with power disruptions differently than those without.

Participant 6 introduced an interesting contrast between formal and informal support structures. While formal Points of Invincibility served essential needs, they were often perceived as lacking a conducive atmosphere for productivity, as P6 noted their preference for a co-working space in a shopping center. This distinction illustrates how different segments of the population adapted to the crisis according to their immediate needs—some sought warmth and basic necessities, while others prioritized maintaining professional responsibilities.

Ultimately, Points of Invincibility represented a context dependent, situated sociotechnical system where technology (generators and power stations) and social dynamics (local community engagement and government support) interplay to provide critical services during crises. The effectiveness of technological solutions often depends on social frameworks, such as community networks. The informal community engagement at these points also reflects a shift in agency from a purely governmental structure to local residents taking initiative in their collective well-being. In the end, the Points of Invincibility, both formal and informal, raised issues of equity in access to technology and support systems. While the emergency hubs provided free power services, the reliance on these spaces revealed the socio-economic disparities in resource availability among residents to navigate blackouts.

7. Discussion and Conclusion

I started out the project asking myself how the local residents of Kyiv coped with the power outages and blackouts, what workarounds they created and how they managed through. I have also asked myself how this case study fits into the broader category of the studies of vulnerability and adaptation of modern technological cultures in the realm of science and technology studies, as well as what the role of technology and innovation in modern crisis adaptation is. In order to answer these questions a three-week ethnography fieldwork combined with nine individual narrative interviews and a paired one was conducted in Kyiv.

The results of the project present the locals' very first experiences and interpretations of coping with power outages and blackouts during the period of October 2022 and February 2023 — a snapshot of time reflecting both temporarily and spatially contextualized interpretations of modern urban communities living in the realities of uncertain power outages and large-scale blackouts affecting the entire city.

The stories of experiences and various ways of coping with power outages and blackouts narrated by the locals, reflect the **kaleidoscope structure** – in the end, each story, experience and reflection on technological methods of adaptation to living off the grid was a unique coloured piece of glass in the socio-technical construct of society resembling the structure of the tube instrument. Ultimately, the metaphor of kaleidoscope has also captured the **temporality** of the moments of blackout experiences, which were recalled by the residents during the conversations, as well the actual moments when these survival experiences occurred, embodied later in the form of narratives shared during the interviews. Even the informal distinction between power outages and blackouts reflected the temporality dimension – while power outages were locally perceived as shorter in duration, blackouts were associated with more prolonged interruptions.

Despite the fact that the study encompassed the experiences of 11 residents, including my personal observations and reflections, each blackout survival story reported unique and localized experiences. These **situated experiences** and ways of coping with blackouts varied by neighborhood and individual context. This aligns with a broader understanding of **sensemaking**, where people tend to perceive and interpret adverse events in an individual, situated and localized way, even though sometimes these cognitive practices might overlap with, reflect and literally mirror the overarching collective existing knowledge-making frameworks (Kornberger et al., 2019), where shared understandings serve as a basis to explain the logics of the challenging events.

The process of narrating during the interviews was also diverse among the participants: while some locals reflected on their experiences sharing more detailed and personalized accounts, others preferred not to go too much into details. The method of **narrative interviews**, while well-suited for studying sensemaking and knowledge-making practices in local communities, offering more flexibility to the structure of the narratives, had nevertheless its own limitations, such as dependency on how well participants could articulate and reflect on their ways of coping in a detailed way, reliance on memory and retrospection as well as ethical complexities of bringing up emotional topics of recalling the challenging situations.

Ethnographically the study has captured the observations of socio-technical adaptations of the urban residents in Kyiv during the power cuts and blackouts in winter of 2022-2023. From an **auto-ethnographic perspective**, this study inherently involves the footprint of me as a researcher and the observations made at the moment of time the fieldwork was conducted. Essentially, the study findings encapsulate both a collection of blackout survival stories — knowledge-making practices (such as life-hacks sharing), as well as instances of proactive socio-technical adaptations in the forms of utilizing alternative technology (such as power banks, flashlights, camping stoves, generators and portable power stations) to substitute for the loss of the centralized power supply. **Inventive solutions**—such as light chatbots, and community-run aid boxes—have also emerged in response to the energy crisis on a broader societal level.

The **most challenging aspects during the blackouts** involved both technological and emotional adjustments of the daily routines to the unpredictable power outages amidst uncertain socio-political conditions. As reflected by the locals, sometimes, during blackouts the most difficult thing was not only the physical absence of lights, heating and (often) water, but also the absence of the ability to recharge the electronic gadgets and to use the Internet and make calls as the cellular network was often disrupted by the infrastructural breakdowns as well. There was also a **collective tendency to rank these challenges**, with some viewing the blackouts—triggered by targeted and indiscriminate attacks on energy infrastructure—as secondary to the overarching existential threat of survival in war conditions.

Power disruptions further highlighted **inequalities in vulnerability exposure**, with different social groups facing varied levels of risk and access to resources. These disparities were also evident in the accounts of residents interviewed. Many expressed empathy and compassion for families with small children in high-rise buildings, who were deprived of elevators during power outages, as well as for elderly or mobility-impaired individuals facing similar challenges. For some residents, this empathy has also functioned as a comparative mechanism for emotional coping.

Throughout the research process, vulnerabilities of modern socio-technical societies, dependent on using technology in their everyday private and professional lives, has become visible and came to the foreground. Coping with power outages and blackouts has transformed into **the stories of (self-)em-powerment**—both in the literal sense of restoring power and in the symbolic sense of regaining individual autonomous **agency of power** (Haraway, 1988). In this context, empowerment meant creatively adapting or “tinkering” with technology, reducing dependence on centralized power systems, and developing both technical and emotional preparedness to the blackouts scenario in the context of the broader socio-political landscape marked by targeted infrastructure breakdowns. Through the process of interaction between society, infrastructure, and individual agency, everyday technological improvisations have redefined the *infrastructural living* in large urban settings (Graham; 2015), dynamically altering the overall landscape of a contemporary *cyborg city* (Swyngedouw, 1996; Gandy, 2005; Swyngedouw, 2006).

Vulnerable conditions have also created an environment conducive to create, innovate and think out of box. The residents have reported and demonstrated numerous examples of blending local knowledge, existing technological and knowledge resources as well as ingenuity to create practical solutions to navigate unpredicted power outages and blackouts. These popular experimenting with the technology on a lay expertise level of knowledge and skills occurred on both on individual and collective levels.

The examples of **tinkering and bricolage** (Bijker et al., 2014; Kuper et al., 2017) included refixing the old generator running on petrol to make the unit operate on gas out of economical considerations, repurposing the automotive batteries to create a DIY-power station at home or creating a social media chat bot to inform the subscribers about the availability of power. The residents, who recalled coming up with practical DIY-solutions, assigned symbolic meanings of small victories to these technological adjustments – making do was crucial to repair and maintain the semblance of the normality of the disrupted lives in conditions demanding multiple kinds of adaptation. Ultimately, every successful “click” in tinkering and bricolage has become crucial for the emotional well-being of those who have managed. While centralized technologies, like the power supply, could impose a sense of exclusion, small technological adjustments and successful improvisations offered a sense of empowerment for the communities affected by the loss of power.

The **narratives of technological adaptations** reflected the diverse ways the residents attempted to alleviate physical constraints of blackouts in their daily routines. Adjusting the use of technologies to local context and individual power needs illustrated there are **no standardized “one-size-fits-all” technological solutions**, an idea that reflects the use of technology is not is not universal but situated and

fluid even in smaller geographical settings (Haraway, 1988; Laet and Mol, 2000). While many locals turned to simple, old-school solutions like portable gas camping stoves, others adopted more advanced options, integrating generators, portable power stations like EcoFlow, and even solar panels to reduce reliance on fossil fuels. The latter options proved more sustainable for long-term use and were generally preferred in private households. However, gasoline generators remained widespread as backup power for local businesses, hospitals, and schools, especially in outdoor or large-scale settings. In this way, one dimension of adaptations envisaged **hybrid technological resilience strategies** — a combination of grassroots technological ingenuity with “old but gold” traditional systems.

Technology choices reflected a balance between immediate accessibility as well as practical (and sometimes even environmental) considerations. The decision-making process was influenced by factors, including economic constraints, living arrangements, safety concerns, background technical knowledge and skills, as well as market availability of alternative power supply solutions. The experience of integration of the alternative devices in daily lives was context dependent and differed from individual to individual also in terms of background knowledge and technical skills. While some reported having integrated the alternative technological devices in their lives relatively easily provided one had technological skills and some background (technical) knowledge, others recalled difficulties on the initial stage of utilizing alternative technology to navigate the power cuts.

The crisis situation of blackouts amidst broader socio-political landscape of war has also exacerbated both **socio-technical** and **socio-economical inequalities**, raising the questions of *who, when, and how could access and afford alternative technological solutions* to navigate a life as close to the “normal” as possible. It has also highlighted the disparities in resources. In crisis situations, demands for the equalization of hardships emerge, particularly when resources are scarce, and not everyone’s needs are met in the same way (Mayer et al., 2015) .

The experience of power outages and blackouts has lead to the formation of a range of **semi-formal support initiatives**, spanning from the informal individual acts of support on a neighborhood level, to collective purchases of generators, installation of aid boxes in the elevators of the multi-storey buildings, ending up with the government-supported emergency power hubs, known as the Points of Invincibility.

Emotional adaptation encompassed gradual **acceptance and normalization** of the blackouts, the sensemaking processes described included the growing awareness of the logic of targeted breakdowns to demoralize the population. These cognitive processes resulted in **blackout resilience having emerged as**

an end-product, with the local residents interpreting these outages as challenges to endure and overcome. The perception of blackouts as deliberate acts meant to demoralize the local communities is one of the examples of how socio-technical systems can be manipulated to affect the public morale. Despite the traumatizing experiences, this logic has been counteracted with a commonly shared narrative of “collectively moving on” (Hilgartner, 2007, p. 155) combined with a collective belief of temporality of “living off the grid”.

Emotional care strategies were nevertheless closely intertwined with technological adjustments in daily life—without the integration of alternative technologies in daily life in the blacked out city, it would have been impossible to find comfort (both in emotional and material senses). In that sense, technological adaptations were crucial for caring for emotional well-being in challenging times. Alternative technologies have become a means of care for normalizing life (Lindén & Lydahl, 2021), contributing to the formation of **socio-technical resilience to blackouts** as a part of the broader techno-political culture of resilience.

As a result of proactive adaptations to power outages, an identity of a “**resilient citizen**” has emerged both as a socio-political and a socio-technical construct – where there was a standardized understanding of a citizen resilient both technically and emotionally to power outages, capable of maintaining life as close to the normal as possible during the war. “Resilient citizen” was supposed and even expected to offer a hand of help at any time, to support and care for those in bigger need – revealing the “darker sides” of care (Martin et al., 2015, p. 627; Lindén and Lydahl, 2021, p. 4) in times of adversity.

Ultimately, the experiences of overcoming blackouts became stories of self-empowerment—literally, through alternative power sources, and symbolically, by reducing dependence on centralized energy infrastructure. This fostered a culture of resilience, where urban residents (re-)claimed agency over their own technological and social solutions, preparing for unpredictable power cuts and prolonged power outages.

Collective **narratives of hope** related to blackouts caused by targeted infrastructural breakdowns as a result of military actions circulated around the city not only verbally; they were also physically embedded in the forms of street art and graffiti as visible reminders of the resilience encrusted in local socio-political culture. This represents the formation of a **modern bottom-up techno-political culture of resilience**, a bottom-up shift of the agency of power, as the locals have been actively shaping their own social responses and technological solutions to disruptions of power supplies.

There has been also a common narrative of the **anticipated temporality** of the technological disruptions mirrored in many stories shared by the locals – the residents found unique ways of explaining the logics of this temporality to themselves – some were anticipating the power outages and blackouts to cease in the beginning of spring time, as this seasonal time of nature was assigned with a meaning of rebirth and revival; some were expecting the warmer season being more conducive to producing the power using alternative green energy like solar panels and wind turbines; others were anticipating the overarching socio-political context to change in a positive way, which could exclude the probability of the targeted infrastructure breakdowns and allow for the repair and reconstruction processes to begin in a full swing.

This anticipated temporality was still present in the narratives shared by the residents of Kyiv during the summer of 2023, nearly half a year since the first winter of blackouts in Ukraine had temporarily come to an end. Collective support mechanisms also had ephemeral nature, as most of these initiatives (such as the Points of Invincibility, light bots and aid boxes) were halted (put on pause), as the situation with power supplies had temporarily stabilized in spring and summer of 2023. The locals also reflected this temporal nature of collective initiatives, recalling that eventually people just returned to their usual ways of living.

However, just like in the theory of sensemaking, the language of *local knowledges*, or any other knowledge-making practice, the narratives of resilience dynamically change and co-evolve over time, which is why a study conducted a year later in the same spatial settings would most likely result in different empirical findings. These could differ not only in terms of how the residents' adaptation strategies co-evolved over time (as I write it at the end of 2024, the power outages still continue to occur), but also how their interpretations, perceptions, anticipations of living off the grid change with the time passing. Further studies on the topic could also expand on the role of technologies in modern warfare, where civilian energy infrastructures often become a weapon of disempowerment of civilian populaces.

Ultimately, a study conducted in slightly different spatio-temporal dimensions could bring a new turn of the kaleidoscope of narratives – a new configuration of dynamically changing experiences and blackouts survival stories. Reflecting the pieces of colored glass, these co-evolving interpretations could produce new kinds of ever-changing patterns of humans interacting and experimenting with technologies as a means of care, particularly in times when communities are most vulnerable to technological failures. Just like the patterns of kaleidoscope, the narratives of socio-technical resilience in this study continually transform, reflecting the temporal and fluid nature of human experiences with technology.

7. References

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8. Appendixes

10.1. Interview Guide in English

1. **Introduction and Demographic Information**

- a. Can you please introduce yourself briefly (e.g., name, age, occupation, professional/educational background, current location)?
- b. Have you been residing in the city since the beginning of the last autumn-winter season (2022/2023)? // How long have you been living in the area?

2. **As It Started: Initial (Emotional) Responses**

- a. Do you remember when power outages started? What was your first reaction? What were your immediate concerns or priorities?
- b. Can you please describe how power outages and blackouts have personally affected you and your daily life?

3. **Personal Narratives and Emotional Experiences**

- a. How did these power outages and blackouts affect your daily life and the lives of those around you? How did it impact your overall well-being?
- b. Can you recall the emotions you experienced when dealing with power outages?
- c. What was the most challenging / difficult for you?

4. **Coping with Energy Supply Disruptions**

- a. Can you share any ways you coped with power outages? How did you manage your household (and, if applicable, work)? What alternative devices did you use?
- b. How have you adapted your daily routines or lifestyle in response to these challenges?
- c. How did you come up with the solution? Did you hear it from someone else? Do you consider it a *solution* as such?

- d. Have you developed any alternative or backup plans? If so, what are they and how effective have they been?

5. Grassroots Support Initiatives

- a. Have you noticed any increase in community support and social cohesion during the crisis situation? What were general trends of how people responded to the events?
- b. Were there any community initiatives or support networks that emerged to help people cope with the loss of power? Can you provide examples? Did you use any of them?

5. Closing Remarks & Thank You

- a. Is there anything else you would like to add or any further insights you would like to share?

10.2. Informed Consent Form in English (Front Page)



University of Vienna

Faculty of Social Sciences

Department of Science and Technology Studies

Informed Consent

Regarding an interview and the subsequent use of data in the context of a university project

I hereby agree to give an interview on Coping with energy supply disruptions, power outages and blackouts amidst the war in Ukraine.

I have been made aware and agree that the interview will be audio recorded. The recording will be stored by the student conducting the interview for the duration of writing the master thesis. It will be analyzed in the context of a study of the residents of Kyiv coping with the disruptions of energy supply at the University of Vienna, Department of Science and Technology Studies.

The interview recording will be accessible only to the student conducting the interview. Some statements may be cited in the final master research project. My real name and position will not appear in the final research document. The results of the study will be published and stored at the repository of the University of Vienna. The use of the data will be for scientific/educational purposes only.

I understand that the interview is voluntary and that I have the right to discontinue at any time. In this case, the data pertaining to me that already has been collected may only be used with my explicit permission. Also, I am aware that it is my right to retract my consent to the use of my data at any time in the future.

Name of interviewee:

E-mail-address:

Date:

Signature of interviewee

Signature on behalf of student

10.3. Informed Consent Form in Ukrainian (Back Page)



Університет Відня

Факультет соціальних наук

Кафедра досліджень науки та технологій

Інформована згода

Стосовно інтерв'ю та подальшого використання даних у контексті університетського проекту

Я, що нижчепідписався/-лася, погоджуюся надати інтерв'ю на тему "Подолання перебоїв у постачанні енергії та масових відключень електроенергії під час російсько-української війни".

Мені було повідомлено і я погоджуюся, що під час інтерв'ю буде проводитися аудіозапис. Аудіозапис інтерв'ю буде збережений студентом, що проводить інтерв'ю, на час написання магістерської роботи. Він буде проаналізований у контексті дослідження того, як резиденти Києва впоралися з перебоями в енергопостачанні під час атак на критичну енергетичну структуру в Україні, при Університеті Відня (Австрія), на Кафедрі досліджень науки та технологій.

Запис інтерв'ю буде доступний лише студенту, що проводить інтерв'ю. Деякі висловлювання можуть бути цитовані у фінальному дослідницькому проекті. Моє справжнє ім'я та посада не будуть вказані в кінцевому дослідницькому документі. Результати дослідження будуть опубліковані та збережені в репозиторії Університету Відня. Використання даних буде здійснюватися виключно для науково-освітніх цілей.

Я розумію, що участь у цьому інтерв'ю є добровільною і маю право в будь-який момент відкликати свою згоду. У такому випадку дані, які вже були зібрані під час інтерв'ю, можуть бути використані тільки за моєї явної згоди. Також я усвідомлюю, що маю право в будь-який момент у майбутньому відкликати свою згоду на використання моїх даних.

Ім'я особи, що надає інтерв'ю:

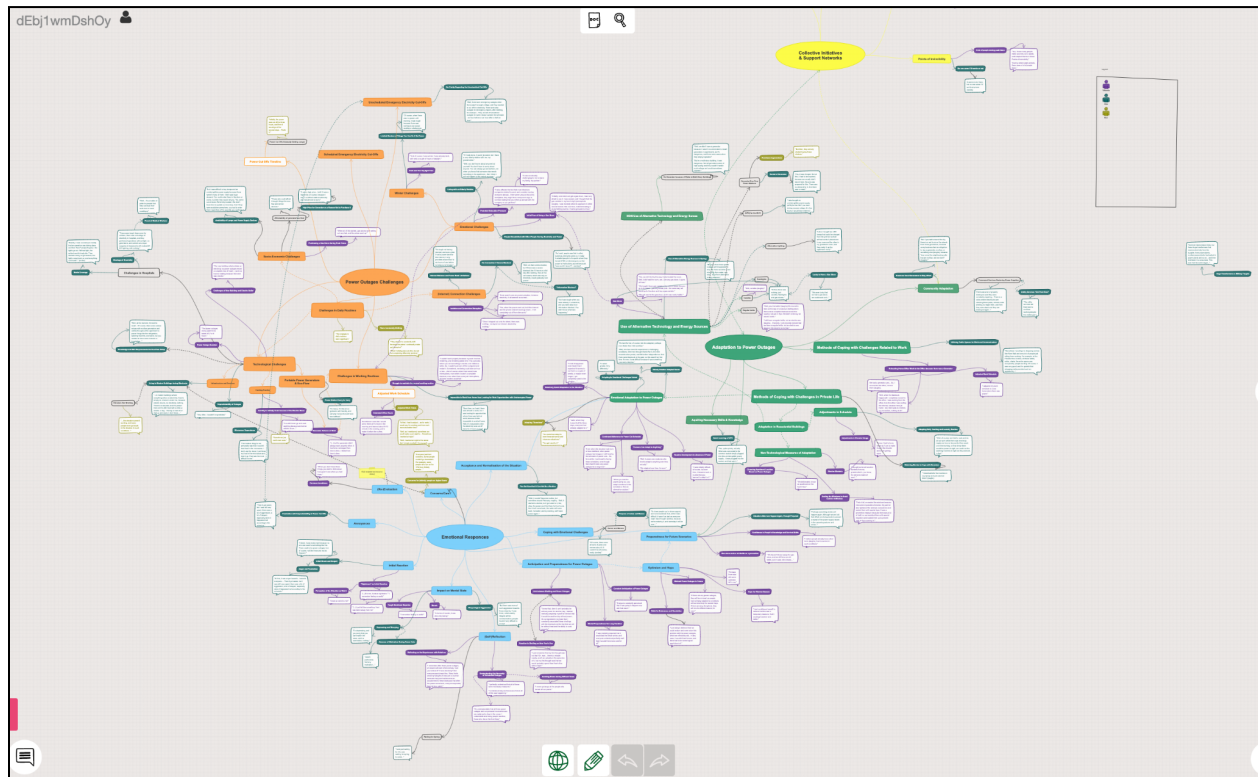
Електронна адреса:

Дата:

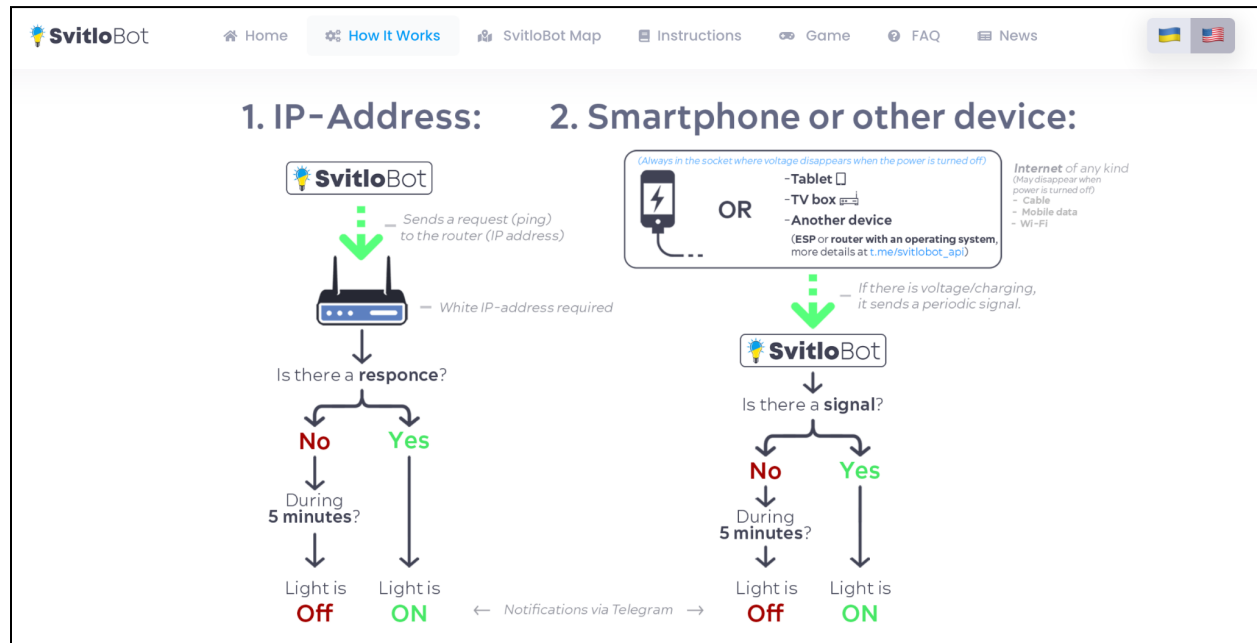
Підпис особи, що надає інтерв'ю

Підпис студента

10.4. Mapping The Codes, Categories, Themes and Narratives

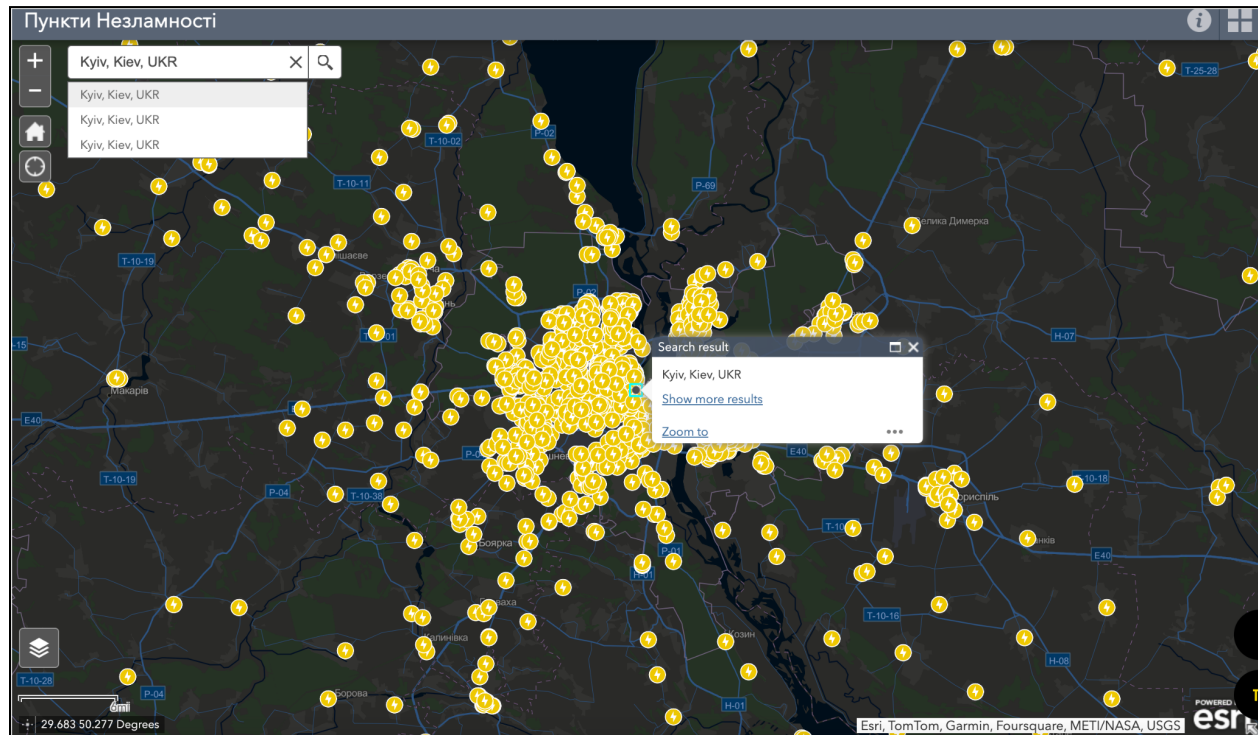


10.5. Light-Bot: How It Works⁹



⁹ Retrieved on November 1, 2024 from https://svitlobot.in.ua/#how_it_works.

10.6. Map of The Points of Invincibility (Kyiv)¹⁰



¹⁰ Retrieved on November 3, from <https://nezlamnist.gov.ua/>.