

Improving Shacks, Upgrading Settlements: An ethnography of solar power infrastructure in the informal settlement of Enkanini, Stellenbosh

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Declaration

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Abstract

This thesis ethnographically explores an in-situ upgrading experiment known as the iShack Project. Through the use of ethnography as method the research elaborates on the intricacies and tensions inherent in attempts at establishing a low cost energy institution in the illegal informal settlement of Enkanini. Demonstrating how infrastructures are more than material configurations, this thesis traces the various human and non-human actors, practices and discourses involved in the establishment of the project over the course of ten months. By Drawing of Fergusons' concept of dependence the research shows that although claims are made to the 'apolitical' nature of the method for the delivery of solar power, the iShack Project produces new political subjectivities that at times resist the possibilities of a low cost energy institution.

Opsomming

Hierdie tesis ondersoek etnografies 'n in-situ opgradering eksperiment bekend as die iShack-projek. Deur die gebruik van etnografie as navorsings metode gaan die tesis te werk om uit te brei oor die verwickeldheid en spanning wat inherent is in pogings om n 'n lae koste energie instelling in die onwettige informele nedersetting van Enkanini op die been te bring. Die tesis wys hoe infrastruktuur meer is as net materiele voorwerpe is wat goedere aanlui, en gaan te werk om ondersoek in te stel in verband met die verskillende menslike en nie-menslike akteurs, praktyke en diskoerse wat betrokke is by die stigting van die projek. Deur gebruik te maak van Ferguson se konsep van afhanklikheid toon die navorsing aan dat hoewel eise gemaak is om die "apolitiese" aard vir die lewering van sonkrag te bewerkstellig, lewer die iShack-projek nuwe politieke subjektiwiteite op wat by tye die moontlikhede van 'n lae koste energie institusie weerstaan.

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To Krishna. May you forever remain in my heart, and guide me along the way.

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Chapter One – Introduction

1.1 Background

In South Africa the *in situ* upgrading of informal settlements and dwellings has been recognized by the State as a viable alternative in providing basic services and infrastructure to the poor while they wait for the grid to arrive (DoH, 2004:8). However, as Swilling et al (2011) point out, it takes an average of nine years from commencement for an *in situ* upgrading project to be completed. The Sustainability Institute at Stellenbosch posed the question of what a material upgrade could look like to the “average shack dweller” in the Stellenbosch township of Enkanini. In conjunction with its residents this question led to the coproduction of the *socio-technical infrastructure system* known as the *iShack* (i = improving shack), which in its first iteration takes the form of an experimental solar power system that provides a user’s shack with electricity, albeit only enough to run a few lights, a cellphone charger and a small television (Swilling et al, 2011). However, while minor material objects and its ensuing infrastructure could provide improvement to the living conditions experienced in the informal settlement of Enkanini in Stellenbosch, what remained unclear was what affects this new found experimental infrastructure had on the social and political conditions within the settlement.

1.2 Research Problem and Rationale

The *iShack* project depends on an intricate web of relations involving the connection and disassociation between housing policy, land rights, state resources and private funding, lack of basic services and infrastructure, local and expert knowledge, material objects and human actors in the form of politicians, policy makers, engineers and lay people. It’s coming into material existence therefore cuts across scientific, political, social and public spheres in its

interaction with human bodies that in turn are said to be producing new configurations of life within the informal settlement of Enkanini. So how are objects such as solar panels, light bulbs, cellphone chargers, televisions and watt meters redefining what infrastructure is and how does the presence of solar power as a development initiative negotiate the material uncertainty, social and political relations within Enkanini? How could such incremental upgrades to informal dwellings reconfigure life within shacks and the informal settlement itself and to what end? In short, this thesis sought to examine the material, social and political outcomes of the iShack Project as an infrastructure embedded in the context of the informal settlement of Enkanini.

The relevance of such questions lies in accounting for the iShack Project as an intervention which is circumventing traditional political avenues in addressing service and basic infrastructure delivery, such as the provision of electricity, to the poor and marginalised in post-apartheid South Africa. Such disjuncture between citizens and the state produce what Beihl (2012:1) aptly highlights as “unexpected amalgamations of social mobilization, technology, human rights, and transcendental values that break open new grounds in which politics are waged and ideas of what is socially possible and desirable are refashioned”. This thesis suggests that the iShack is one such amalgamation, acting as an experimental development phenomenon in an uncertain and yet highly contested space.

1.3 Literature Review and Theoretical Framework

Making sense of the iShack Project and its particularities as a set of objects both human and non-human objects capable of mediating material, as well as social and political relations required a reading of three strands of literature. The main bodies of literature examined for the purpose of this thesis are situated in the anthropology of infrastructure. However, the

literatures reviewed are not exclusively tied to infrastructure, and span across the fields of an anthropology of development, political anthropology and science and technology studies. These fields and the bodies of literature explored serve as the theoretical and conceptual framework for thinking about infrastructure and with infrastructure as means of exploring the logics of development, its politics and the bodies it shapes.

Anthropology has seen a burgeoning amount of scholarship focusing on infrastructures beyond their material form. Infrastructures' are, von Schnitzler (2016) argues, not simply ethnographic objects, but an epistemological point of departure (See von Schnitzler, 2016). The next section gives an overview of some of the productive concepts and theories through which to think with and through infrastructure in the discipline of anthropology.

Defining Infrastructure: In *Ethnography as Infrastructure* Star (1999) defines infrastructure as being a 'fundamentally relational concept', "becoming real in relation to organized practices" (Star, 1999:380). Such a fluid conceptualisation allows for reflection on infrastructure beyond merely physical properties. Thinking about how infrastructure is 'done' and 'made' allows for how infrastructures are be studied and conceived of never as a thing, but always "a relationship or an infinite regress of relationships" (Bateson, 1978: 279 in Star 1999; see also Lezaun and Woolgar, 2013). Therefore the iShack Project in its broader sense is conceptualized as a *socio-technical system* understood as a "system of activities" or practices, made up of heterogeneous linkages of "purposive, goal-orientated action in which knowledge and behavior are reciprocally constituted by social, political and material phenomena", of which these processes are always in flux, never stable and always in a process of becoming (Pfaffenberger, 1992:508; Law and Lien, 2012:365).

Infrastructures' are more-than-material relations: From an anthropological perspective, conceptualizing infrastructure as more-than material relations not only emphasizes the consideration of an awareness of the myriad of actors and their relations that create working

infrastructures. It also takes into account that infrastructures are to be considered as accretions, which Anand (2015) defines as unsteady human and non-human relations of “discourses, materials, practices, and technologies that actively need to be bound together through techno-political projects”. Such a conception of infrastructure is useful as it allowed for the consideration of the actors and the conditions under which infrastructures such as the iShack Project come into being and have to operate under.

Infrastructure as Politics and The Politics of Infrastructure: In relative absence of the states ‘visible’ presence in Enkanini the iShack Project - as a response to the state’s inability to provide housing and basic infrastructures - requires further consideration. This lends itself to the question of how infrastructures come to govern the subjects with whom it comes into contact, and what types of subjectivities it enables or denies in the contemporary urban moment of post-apartheid South Africa.

Technopolitics: This reading of infrastructure is productive of the concept of technopolitics, which addresses liberalism as form of government that disavows itself, and seeks to organise populations and territories through technological domains far removed from political institutions (Larkin, 2013:328).

The work of von Schnitzler (2008, 2013) surrounding water meters, calculability and citizenship in South Africa is a productive site for engaging infrastructure through the concept of technopolitics. von Schnitzler (2008) has argued that in South Africa “the provision of infrastructure and the technologies deployed with them are invested with and productive of social and political relations that do not serve as a neutral conduit for the provision of services, but has always been bound up with questions of belonging and citizenship” (von Schnitzler 2008, 2013). Furthermore, as an anthropological engagement with infrastructure, von Schnitzler (2013) inquires into how technical devices in their design, are scripted with, and reflect specific ethico-political projects (von Schnitzler, 2013; see also

Redfield 2012). Furthermore von Schnitzler suggest that “infrastructure” itself comes to be the political terrain on which questions of basic needs and the rights and obligations of citizenship become negotiated and contested (von Schnitzler, 2013:671). Rather than reading politics off of infrastructure, she argues for reading infrastructure as a politics in itself, which in turn offers “methodological and conceptual space” for the exploration of the importance of the material in constituting political actors and political engagement with the State (Mitchell, 2002; Von Schnitzler, 2013).

Such an approach to engaging with infrastructures makes possible a reading of the extent to which it is able to produce politically engaged citizens who Chatterjee (2004) suggests would otherwise have had little success in negotiating and contesting access to the condition conducive to a good life through formal political channels. Infrastructure read as a politics could thus be said to speak for the rights of citizens just as much just as it can define their rights as citizens (von Schnitzler, 2015).

Infrastructures are also invested with political aspiration and forms of governmentality and it must be recognized that they are situated in spaces that may already be productive of a politics. In South Africa, infrastructures become embedded in sociopolitical context that were once rooted in and presently still are materially affected by the remnants of Apartheid spatial planning. Therefore infrastructures understood as conduits of social and political change must be considered as having to act within spaces with prior geographies and histories of connectivity (Harvey and Knox, 2015:52). As Anand (2015) has argued, infrastructures are always attached to already existing worlds, and thus infrastructures not only affect the spaces they are attached to, but are also affected by its immediate surroundings and socio-political context in which they are deployed.

Infrastructures’ and futures imagined: Infrastructures’ are also conduits for imaging future possibilities. They have, as Reeves (2016:7) suggests, a temporal rationality that point to

futures not yet brought into being, and can therefore be read as either a locus of anticipation or disillusion. This conception of infrastructure proves useful for gauging the possibilities infrastructures bring into being, either as imagined, anticipated and foregone. In the context of Enkanini this is an especially important analytical lens through which to explore interlocutors' perceptions of the possible worlds the iShack brings into being or denies.

Development actors: Further examination of the futures infrastructures gesture toward and the political subjects it creates requires one to question how development takes place, what material forms infrastructures take and also who the providers of infrastructure are. Bodies of anthropological literature exploring the state's role in development and the way it produces subjects of political life include Ferguson 2004; Povinelli 2011; and Beihl, Good and Kleinman, 2005). These texts examine the politics surrounding the provision and use of technologies and infrastructure in the late-capitalist state, which open up questions of the possible ends they serve, who it includes or excludes and what forms of life it denies or enables.

Drawing on Fergusons' (2013) work on dependence in South Africa serves a means of analysis of the extent to which particular development actors and the infrastructures they employ come to not only govern, but also subject bodies to particular modes of being .

Boundary Objects: Situated in the discipline of Science and Technology Studies, a useful concept that has been incorporated into anthropology of infrastructure is what Star and Latour (2004) refers to as a *boundary object*. Unpacking this concept Star (2010) explains that an object is something people act toward and so its materiality derives from its action and not from some pre-existent "thingness". Moreover, boundary objects are temporal, based in action, subject to reflection and local tailoring and distributed through all these dimensions

thus making them multi-dimensional (Star 2010:603). An example she gives is that of a road map. It may point to places of recreation for one group, but it may also serve as a map that follows geological sites of importance for scientists (Star 2010:602). What this exemplifies is a situation where objects are always open to what she refers to as an *interpretive flexibility* (Star, 2010; Michael, 2000) Furthermore *boundary objects* she says, “are a sort of arrangement that allow different groups to work together without consensus” (Star, 2010:602). This concept thus makes a useful contribution to an understanding the iShack Project as a product of material forms and interlocutors’ interpretation of these forms.

1.4 Key Research Question

The literatures presented on infrastructures, its politics and the human bodies and social contexts with which it comes into contact with produce a series of research questions that seek to address and reveal the complex interplay between the providers’ of solar power infrastructure, its material form, and the actors with whom it comes into contact:

- How is the iShack being construed as a viable alternative for the delivery of basic services?
- What are the limits of the capabilities of the iShack Project in providing for human need?
- Could the iShack Project reconfigure what is socially desirable and politically possible within informal settlements?
- How does the iShack as infrastructure reformulate and reconfigure Enkanini residents’ perception of what life should be in the post-apartheid state and to what extent does it succeed?
- How does it come to mobilize people in their interactions with the state, what forms do those interactions take, and what political subjectivities are created in the process?

These questions provide greater clarity and understanding of how we make sense of providing for human need in ways that stretch beyond the normative perceptions infrastructures' and development as neutral conduits for the distribution of good and services. To conceive of infrastructure as moving beyond technical functionality into the realm of the social where the meaning of infrastructure is left open to various interpretations by the state, engineers and consumers could help unpack what maintains the iShack Project as more than mere material relations. How the iShack mobilizes certain human and non-human actors capable of mediating social relations and producing political will for the purpose of creating self-sustaining communities is a complex techno-political question. In asking these questions, this thesis attempt to unpack these questions in order illuminate how the iShack Project is simultaneously embedded with and productive of social and political forms and aspiration. Such a posturing is premised on the perception that worlds are created, shaped, designed and folded together through various actors – human and non-human – and as such can at any time produce or negate the social and political spheres of life in which residents of the informal settlements of Enkanini are embedded.

1.5 Methodological Considerations and Research Methods

Ethnography: The epistemological vantage point for conducting the research is situated in the methodological approach of ethnography. The usefulness of this approach toward a study informal settlement upgrades is ability to draw out and make sense of interlocutors' experiences through an interpretation of the lived realities they occupy. Ethnography requires one to take close observation of one's research subjects. In doing so, my time spent in the field included the establishment of rapport with key informants, and keeping detailed field notes. Moreover, the use of ethnography as methodological tool incorporates Geertz's (1973:2) elaboration of what he described as "thick description". In this instance, ethnography as a process of thick description encompasses four parameters, namely:

1. Interpretive study, which traces the manners in which meaning is ascribed.
2. The subject of interpretation is the flow of social discourse. Construed as producing the codes necessary for decoding social events.
3. Interpretations are extrovert expressions. Meaning that the collection of data and its interpretation are limited to what local interlocutors can tell one.
4. Ethnographic descriptions are microscopic. Ethnographic findings describe local behaviours

(The Cultural reader, 2016)

These four parameters form the guidelines to which the ethnographic process ascribed throughout the course of data collection and interpretation of the empirical data.

The main site where data collection took place was the informal settlement of Enkanini in Stellenbosch. Having lived in the settlement for a period of four weeks over the course of four months between November 2014 and March 2015 all empirical data presented in situated within the context in which the iShack Project operated. The choice to live in the settlement had two advantages. First, this allowed me to become embedded in the space and gain the trust of residents whose homes became sites for conducting interviews. Two, this allowed the data collected to reflect the narratives and practices of those a part of and closets to my ethnographic object and research interest. Thereafter intermittent field visit were made between the months of March and August 2015. This allowed for continued following up on my research participants experiences along the iShack project and formed the basis for reflective thinking about the course the iShack project had taken to accommodate and adapt to ever changing social and political wills found within the settlement.

Methods for gathering of data: Participant observation was employed in gathering field data on the day to day life in Enkanini. It also allowed me to not only observe living conditions

within the settlement, but also the ability of the experience first-hand the improvements in living conditions the iShack could provide. This allowed the possibility of rigorously and sensitively developing an account of the experiences of participants' interactions with the iShack in their homes. Furthermore I also accompanied iShack project employees – or technicians as they are known – to observe how they install, repair and maintain the iShack technologies in the homes of new and established users in Enkanini. This gave me a broad sense of the various actors who form the networks of relation that produce the iShack as an infrastructure as well as allowing the tracing of the practices and narratives they produce in the installation of the systems in people's homes.

Structured and Semi-structured interviews: These were employed in my discussion with users, non-users and iShack employees regarding how they perceive and experience what the iShack offers to life in Enkanini. In gathering information from the local municipality regarding the delivery of services to Enkanini, questions of how the iShack supported or negates development policy were put forth. Here some structured interviews with specific questions relating to their understanding of the iShack and its ability to become a viable alternative development strategy were employed and should prove fruitful given the established partnership between the Sustainability Institute and the local Stellenbosch municipality. Structured interviews were also used when interviewing employees of the iShack project and SI researchers. Access to iShack project employees have been granted to me by the Sustainability Institute and my questions were focused on the logic of the iShack project and their understanding of how it is able to mediate social change.

Given my situatedness in a space that was at times difficult to navigate through on account of my race and lack of understanding Xhosa, means by which data was gathered had to be adapted in order to allow greater ease of movement in the process of collecting field data. Combining the strengths of ethnographic observation and interviewees, go-longs' allows one

to accompany interlocutors on their ‘natural’ outings and as a method is useful for “actively exploring subjects stream of experiences and practices as they move through, and interact with, their physical and social environment” (Delamont and Atkinson 2003:12). This technique was particularly suited for exploring spatial practices and social realms that I came into contact with while moving through the field site (Delamont and Atkinson, 2003:16).

These methods allowed me to capture, albeit only for a short amount of time, the lived experience of my interlocutors not how things should be, but how things actually are and why. Latour (2004) suggests that in order to understand how ‘things’ come to be we need to follow the actors themselves in their connections and disassociations that make up what things and how we use them. In doing so, the use of ethnography allowed for the biographies of the iShack Project as an infrastructure to be traced as it becomes situated in everyday life.

1.6 Ethical consideration

In conducting field work and gathering data in Enkanini, I at times made informal appointments prior to interviews in order to adhere to any request and negotiate any uncomfortable topics or inconveniences that might arise in entering residences. In these instances verbal consent was employed to collect data.

In order to ensure participants wellbeing verbal consent was provided in English and Xhosa. Participants had a right to refuse to answer questions they felt uncomfortable with and could withdraw from participation at any time. Visits to participants’ residences and interviews were conducted during the day in order to secure my own safety in the informal settlement. Given the nature of the space I acknowledge that I have come to witness forms of violence, crime, injury and misconduct. These incidences were reported to my supervisors in meetings. I acknowledge that my role as researcher meant that at times I was seen as an ‘intruder’, but

through gradual interactions over time the creation of ‘co-presence’ resulted in the affordance of mutual respect between me and interlocutors.

Moreover, the research was carried out on the basis of not harming the dignity, bodily or material wellbeing of my research participants’. Furthermore, I take note of the impact my research and its outcomes had on the wellbeing of participants. I also acknowledged any contingencies of conducting research in the field and how that affected the outcomes of the research. I was open and honest about the purpose of my research and my presence considering that my race, gender and class affect my ability to move through the field work space. Doing so helped to avoid any claims of harm to participants. All data gathered was kept secure with password and encryption software. Hand written field notes were locked away and only my supervisors and I had access to data collected while in the field.

1.7 Chapter Overview

In chapter two I introduce the informal settlement of Enkanini as a space that is at once both lived and imagined as a site of extreme material poverty and mundane practices in the perceived absence of state-led provision of basic housing and infrastructure. This sets up the context in which to situate interlocutors lived and narrative accounts of shack inhabitation. Hereafter experiments for reconfiguring alternative housing in Enkanini are described for the purpose of introducing the construction of the Enkanini Research Council as a boundary object seeking to reconfigure perceptions of what the provision of housing to informal settlements could take on. The chapter concludes with ethnographic descriptions revealing extract my interlocutors of experience of living in the Enkanini research council house. In doing so it concludes with reflections of everyday practices that surrounded its habitation.

Chapter three introduces the concept of the centralised grid as the modern normative ideal for the provision of basic services and considers the argument for its slow, but steady inability to provide on its promise of universal access to electricity. In doing so it sets up the argument for the transitions toward a low carbon energy future and grid alternative. In considering the future of grids in the context of the informal settlement of Enkanini the chapter introduces the iShack Project as an infrastructure experiment aimed providing solar power to individual shacks. It then continues to provide a reading of infrastructures as ‘accretions’ and traces the various and often contradicting practices, narratives and discourses tied to the technical specifications and limitations of the solar systems installed. It concludes with a reflection on the ability of infrastructures’ like the iShack to be a viable alternative to the grid for those residing in the gaps that exist in the state’s ability to provide access to basic services.

Chapter four elaborates on the politics that arise from the iShack Project’s use of particular logic of development tied to the market. It demonstrates how that the provision solar power via iShack Projects - framed as an ‘apolitical’ development initiative – comes to stand in the way of residents claims to dependence on the state for the grid and legitimate development actor.

Chapter 5 concludes the thesis by tying together the technical, social and political aspirations and outcomes uncovered during the course of the research journey. Resisting any claims to the success or failure of the iShack Project, this chapter acknowledges the process of transition toward solar power in Enkanini as inherently complex and unstable. It concludes with recommendations on future research avenues that could stem from the research conducted within this thesis.

Chapter Two – Dwelling and Everyday Life in Enkanini

“Worlds are made before they are lived in...so that acts of dwelling precede acts of worldmaking”

- Tim Ingold

2.1 The Dichotomy of the Slum

The road leading up to the foot of the Pappagaaiberg against which Enkanini nestles is lined with various small businesses, a fish and chips shop, a chemical factory, and some empty buildings that looked as though they once housed factories of some sort. ‘Bridge Street’ the sign against the curb reads, ‘the irony’ I think to myself as we approach the entrance of the settlement. Coming from the urban centres with its materially defined norms of housing and grid infrastructure, it is a crossing into another life world seemingly invisible when looked upon from the centre of the town of Stellenbosch. The tarred road leading up to the settlement becomes a big circle, signalling a turn around. People move about freely, there are men in blue overalls on their way down the hill toward the town of Stellenbosch, women carrying groceries on their heads moving up in between the shacks, a man urinating, in the open. Shacks line the hillside and stretch up into the mountain, the full size of the settlement hidden from view due to the steep topography of the site.

I seat myself on the veranda of the Enkanini Research Centre [ERC], a structure built to resemble a shack. It is my home for the course of my stay. Awaiting Zandile’s return from a community clean-up operation along the river running through the settlement, I interact with some passers-by who greet and move on; I greet in Xhosa, ‘Molo’. Others simply stroll past and stare up at me with my book and pen in hand – often residents would ask what it was I’m doing, my reply always phrased along the line of “I am looking at the world”.

I see dense patches of 'shacks' built of rusty iron sheets and wood stretching down into the path of a narrow river. On the opposite side more shacks line the steep slope, packed densely next to one another. Roofs are held down by tyres and bricks, and some have small solar panels attached. The structures lining the sides of the dirt road have long branches attached to them with wires, red, blue green, yellow, all zigzagging across the road above my head and down into the flurry of shacks - 'Informal power' as Zandile calls it.

Some structures are lopsided and small, no more than 3x4 meters in size, while others are painted neatly, and surrounded by small gardens where vegetables grow. Clothes hang out to dry in the late spring sunshine and in the dusty dirt road a couple of dogs are lazing around. Further up the road a blue church neighbours a spaza shop selling daily necessities. Adjacent to the shop stands a communal tap and toilet block where people gather to do laundry, collect drinking water and relieve themselves. The road in front of the ERC is littered with old papers, plastic wrappers, stones and streams of murky water carving small canals into the soil as it flows down the side of the hill. My senses are overwhelmed as the wind throws dust across the landscape, and I pull my face in disgust as the smell of putrid waste fills the air.

The above extract describes the scenes I witnessed when entering the informal settlement of Enkanini. Its material realities are startling to my senses. They have always been sheltered from the realities of material poverty, but now I come to question how we allow such conditions to exist and persist. It is against this backdrop of informal housing, high population density, little and inadequate infrastructure and unhealthy living conditions that such spaces in the 'Global South' have come to be rhetorically referred as belonging to a permanent "state of emergency" on account of the sheer scale of exclusion from socio-economic rights and exposure to unjust living conditions (Davis 2004; Pieterse, 2014).

However, this permanency of distress ironically, rather than stoking mass public outrage and calls for appropriate housing solutions, has become the urban norm as informal housing - or 'shacks' - house 62 % of African urbanites and roughly 50% of the urban poor in South Africa, fuelling the argument for the shack city as being the *real* African city (Bolnick, 2009:2-5).

In South Africa, the ubiquity of the informal settlement renders such spaces part and parcel of the urban landscape, and yet to the average middle class urban dweller the material conditions, activities, actions and desires of those residing in such spaces remain obscured. Furthermore, speculation and prejudice of 'the other' and the normative connotations of incivility and "savagery" of informal settlements are tempered by the social and material forces of the life world the middle classes inhabit and who enjoy access to television and internet media, modern infrastructure and basic services. Moreover socio-economic status coupled with the remnants of Apartheid's socio-spatial engineering assures that such spaces, especially in the greater city of Cape Town remain wholly detached from daily existence of those living in informal settlements along the city's periphery. As such, encounters and depictions of these spaces become familiar to the wealthy, and middle classes from a distance, scattered along the highways, described in text books, depicted on TV, but never actually lived or encountered first-hand.

These realities are generally only witnessed by the middle classes as they are represented in the media in times of unrest or spectacle - the 'toy-toying', the burning of tyres and blocking of roads in protest of the living conditions many endure become framed as 'social delivery protests or simply social unrest (Dlamini. 2011:33). As such, any acts of outward resistance or defiance become portrayed in the media as unorganised and ahistorical events devoid of any rationality. Robins (2014) comments on the tendency of mainstream news media to produce images of such events as spontaneous, collective and unruly actions that reflect

“undifferentiated notions of service delivery protests” producing “homogenising media representation” that deploy actors without political agency and with no local specificity. Such claims to representation produce imaginaries of material uncertainties and hardships people face without locating the historical specificity that have allowed for such demonstrations of anger and frustration to endure, even proliferate post-1994 (Robins, 2014:94).

Enkanini operates on a daily basis with much of the same potency and vigour as the town of Stellenbosch, albeit under somewhat less materially privileged circumstance. Neighbouring the formal settlement of Kayamandi and overlooking the town of Stellenbosch, Enkanini is surrounded by formal housing and grid infrastructures. Holding back from declaring Enkanini a disaster zone it may seem that the settlements is operating under conditions that remain out of sight to the average inhabitant of Stellenbosch. However, the material poverty experienced in the informal settlement of Enkanini could be considered as predicating a ‘slow violence’. Defined as violence that occurs out of sight, as a slow destruction both invisible and incremental, the concept of slow violence as an analytical lens could be useful for the purpose of theory building surrounding the continuous existence and propagation of informal settlements in the face of increasing environmental degradation (Nixon, 2011:2).

However, as a concept focus on the external worlds in which actors are situated it does not lend sufficient weight to the actors operating within such spaces. Therefore, rather than to merely highlight the environmental and material conditions, unjust, crippling or otherwise, leaves absent an awareness of people still going about their daily lives and ordinary practices must be lent sufficient methodological and theoretical weight. Pieterse (2014) considers the realisation of this contradiction of the slum –that of extreme burden and mundane practice - “a necessity for validating the fullness and autonomy of ordinary people”.

To make sense of the materiality of the everyday requires an anthropology that is both reflexive and critical in its theorization of everyday life that at times crystallise in moments of

extreme burden and ordinary practice. In acknowledging this dichotomy one can resist the temptation of the normative in making sense of such life worlds and with it start to employ an ethnography that sets aside sensationalist depictions of disasters, steers clear of a romanticism of dilapidation and avoids reductionist reproductions of narratives of poverty that usually befall such spaces. What this means for anthropology and those who practice it, is closer, reflexive ethnographic engagement with its subjects; situated intimately in their life worlds so as to acknowledge the material uncertainties, but also actors articulations of hope, resistance, acceptance and making due in the processes of realigning ‘trust’ and resisting ‘waiting’ on the promises of material progress, economic prosperity and social wellbeing.

Maybe such an approach seems forced and disrespectful of the material and social boundaries that separates the anthropologist from his subject and their experiences. However, Daniel Miller (2001:15) argues against what he refers to as a “dead anthropology”, one who’s sensitivity about not intruding, whose respect of distance and the conventional social proxemics employed, remains outside, and thus removed from the perspectives of those we wish to study. Drawing on Miller’s methodological consideration, my situatedness in Enkanini amongst the material conditions my interlocutors endure proved useful for undoing distinctions between my experience of ‘everyday life’ and theirs. After all, as Vanini (2009:7) asks, do our own lives as researchers not count? Surely they do, for how else could one sensibly investigate everyday life if having never exposed oneself to the material realities of our research subjects. If we remain outside their domains of life, then not only is the experience wholly foreign to the researcher, but so too are the outcomes and consequences of our interlocutors’ practices of everyday living.

This study draws on two months of ethnographic fieldwork, along with a numerous intermittent site visits conducted between April 2014 and March 2016. Time spent in Enkanini produced field notes on a range of everyday practices. I situate my experience and

observations of these activities alongside my interlocutors' narratives of such activities and explanation of practices in the context of the informal settlement they reside. The use of photographs helped to document the material living conditions and the unfolding aesthetic of the settlement as people moved about their lives; I dotted down notes during verbal exchanges with residents capturing utterances sought to convey the sensual and emotive experiences of living in Enkanini. Often these texts were shared between me and my research companion and main interlocutor, Zandile Tembo*, a long term resident of Enkanini who helped ground my thoughts and interpretations within the context of the immediate surroundings we shared. I draw on these texts in order to critically reflect upon the mundane, "non-events" of everyday life, the creative ways in which the material world and life is constructed and cultivated by my interlocutors in Enkanini, while waiting on the promise of State subsidised housing and grid infrastructure. But first I should provide some historical background to the conditions under which Enkanini came about.

2.2 To Take by Force

'Enkanini' is an isiXhosa expression meaning 'to take by force'. Zandile would remind me of this when we spoke of life in the settlement, as we often did in each other's company. When he conveyed how Enkanini came into existence it was always articulated through the historical forces of rapid urbanisation and housing policy in South Africa post-1994, almost as if to justify the insurgent actions of those who took that which did not legally belong to them. The influx of migrant workers from the Eastern Cape to the urban centres in the early 2000's created a demand for affordable housing that was simply unavailable to many unskilled workers who could not afford rent or access to finance. Under such circumstances land owned by the Stellenbosch Municipality came to be occupied in 2006 when migrant settlers erected informal houses (shacks) next to the formal settlement of Kayamandi. Since

then the settlement has grown to an estimated 2400 households* or roughly 6000 people whose occupation today is still considered illegal by the State (Swilling et al. 2011).

Securing the land did not provide any guarantee of access to housing or the state grid; leaving residents without the most basic of services need to reproduce life in the context of urban South Africa. Enkanini has come to be another example as Zandile notes:

The people here took the land long ago, but what is land when you cannot do anything with it? We need running water, proper toilets and electricity.

Other residents felt even stronger about the need for these infrastructures of everyday life. As one resident who I encountered during a street walk in the settlement made clear.

Christo: What is life like here in Enkanini?

Sino: Hah! What is life here? There is no life here...there is no electricity.

An interview in 2015 with the ward councillor for Enkanini produced the following statement when questioning why such needs have yet to be met.

Ward Councillor: "We cannot build anything there [Enkanini], because the land has not been made available for development"... "The law" she says "would not allow it".

When asked her thoughts on whether residents understood why no electricity has been provided to the settlement, she replies.

Ward Councillor: I think people know this is the case, but maybe some of them just don't want to believe it so they can say the State must give us these things.

By taking the land and erecting the shacks, the problem concerning the securing of land tenure became a decade long dispute involving a myriad of actors (experts, state officials and civil society organisations) contending and contesting the provision of housing and infrastructure in Enkanini. On the one hand, there arise the notion of a need as a material

experience which anchors life- shelter, water, electricity and sanitation. At the other hand, there is the notion of human rights: the claims citizens have toward access to universal goods for the cultivation of “proper” modern life. However, the fact that Enkanini is an illegal settlement meant that the State could not breach its own laws and provide assistance. Moreover, apart from the illegality of the site, municipal officials would also refer to the topography of the site and the density and layout of the shack structures as a concern for providing housing and infrastructure.

Christo: Are there any other obstacles that stand in the way of Enkanini receiving housing and the grid?

Ward Councillor: Yes, the site is built against a steep slope and the shacks are all over the place...There is no space ...where will all the houses fit... It also is a challenge to put down the grid in such a place because it will be very expensive to do so.

The language the ward councillor uses to explain the reason for the lack of housing and basic service delivery in Enkanini is steeped in bureaucratic prose. Land tenure was years away from being processed and technical issues regarding the sites layout and the ensuing economic ramifications of such an attempt would create further difficulties for the delivery of housing and basic services in Enkanini. In light of this some of my interlocutors would claim that this is only an excuse, but nonetheless, this situation placed residents in a precarious situation.

2.3 “Trust and Wait”

By 2011, negotiations between residents, and the local municipality/state were at a standstill. Any assurance of land tenure in Enkanini was years away, and without tenure security no formal housing subsidy could be allocated due to the two being directly tied with one another (Bolnick, 2009:2). What this created was a development void that left many of those tackling

the issues of informal settlement upgrading to question the attempts at overcoming such obstacles. Enter another actor, neither state nor private sector affiliated. The Sustainability Institute of Lymedoch at Stellenbosch University (SI) - Led by Prof. Swilling and made up of a group of student researchers – engaged the settlement in planning alternative development initiatives for the provision of basic services. An interview conducted with Swilling in April of 2014, allowed me to understand SI's engagement with Enkanini as a space for changing processes of development. What follows is an account of SI's commitment to tackling the dialectic of “trust and wait”, as Swilling elaborates.

Swilling summarises the first point of departure for the teams' involvement with the State's notion of “trust and wait”; a simple and, as he describes it, “constructivist research question” that emerged from the engagement between himself, a small group of SI graduate students and the implications of the post-2004 housing policy agenda referred to as Breaking New Ground (BNG). The BNG initiative proposed “a move away from commoditised housing delivery toward more responsive mechanisms”, which would lead to the formation of “integrated sustainable human settlements” (DoH, 2004:8). However, the BNG was neither programme nor policy, and thus had no statutory significance (Bolnick, 2009:3). One implication of this agenda was that communities themselves would have to play a much greater role in the upgrading of settlements by means of incremental in-situ upgrading strategies. Moreover, the Upgrading of Informal Settlement Programme (UISP) had been incorporated into housing policy in 2004, allowing ‘flexible, participative and integrated’ approaches to housing that lent itself to the incremental approach (Mark Misselhorn April 2008 in Bolnick, 2009:4). However the UISP as a funding mechanism for in-situ development strategies could only be accessed if informal settlements were built on land suitable for development (Bolnick, 2009:4). As is presented in the above extracts, Enkanini

was not built on “suitable land”, and so these policy terms automatically disqualified attempts at the incremental upgrading of shacks in Enkanini. As Swilling put it:

So, what does the policy of incremental upgrading in informal settlements mean to the average shack dweller, whoever that may be?...Well, the new policy for the average shack dweller means wait...just trust and wait for the grid to arrive.

(Swilling, April 2014)

The *Oxford English Dictionary* defines trust as: “confidence in or reliance on some quality or attribute of a person or thing, or the truth of a statement”. Giddens (1990) acknowledges the limitation of such a definition of trust on three accounts. Firstly, it does not take into account the social relations involved. Secondly, rather than being static trust is a continuous state. And thirdly, trust presupposes an awareness of circumstances of risk whereas mere confidence in a person or system does not (Giddens, 1990:31-34). Giddens (1990) therefore defines trust as “confidence in the reliability of a person or a system, regarding a given set of outcomes of events, where that confidence expresses a faith in the probity or love of another, or in the correctness of abstract principles (technical knowledge)” (Giddens, 1990:34).

To trust, if we take Giddens seriously, is to presuppose the risk involved in producing any set of goals or outcomes. For Enkanini residents, this meant having the state provide formal housing and electricity, even in the face of growing demands. So, in the case of Enkanini, relying on the State did not reduce the risks already faced in the absence of housing and electricity, but exacerbated it further by leaving residents without any clear indication of when claims to housing and infrastructure could be met.

During verbal exchanges with my interlocutors, many would come to recognise the State’s responsibility toward development by making clear that they voted for the current governing regime that informants claimed had made promises of access to better living conditions -

houses, roads and electricity. However, as one informant noted, soon as elections were over the State and its representative's in the form ward councillors and municipal workers would "disappear".

Anon: We want to see the government; we want them [ward councillors and municipal workers] to come here. To see what we see and deliver on the promises they make to us every year before elections.

(Field note extract December 2015).

The notion of "trust and wait" did not produce any material outcomes for those living in Enkanini. In fact, it merely helped to further reaffirm that Enkanini will remain without conventional housing i.e. a "RDP house" with its related services and a title deed. Therefore, residents were left in a predicament, momentarily having to suspend their trust in the State – whom they believe are the main providers of these infrastructures. Such a suspension of trust in the State and local municipality to deliver on their promises could negate what Swilling refers to as "a negative politics toward development", one which leaves people with very little options for improving their lives. During the course of meeting Swilling proceeds to argue against waiting, and calls for the active participation of citizens in producing change as outlined in the BNG.

Mark: "You don't organise people through wait... in saying that something may happen tomorrow...the argument would be that organising people around an improvement tomorrow is good for citizenship".

The social and material stagnation resulting from Enkanini's entanglements with housing policy, municipal inaction and the settlement's illegal status and topography were met with the SI research group's question of, "well, what can people do while they are waiting?" This sparked the initial contact between SI researchers and Enkanini residents. Swilling referred to

these encounters as “informal and playful” experiments with trans-disciplinary research methods, which is a method of engagement that seeks to produce research that has transformative effects. Both SI and residents acknowledged the housing and infrastructural shortcomings of the settlement. Moreover they came to reckon with the limited possibilities for immediate change if they opted to rely exclusively on the State apparatus. So, if in-situ incremental upgrading strategies are the policy model for the upgrading of informal settlements, the question SI raised was, “Well what does such development strategies look like in practice?” (Mark Swilling April 2014).

For the time being, I will suspend discussion of the material outcomes of SI’s engagement with ‘trust and wait’, returning later to discuss the manifestation of tangible material efforts and the logics that drive the claims of infrastructures as improvement. However, I feel it is necessary to first give voice to my interlocutors’ narratives and experiences of the life worlds constructed while waiting on two grounds. One, it allows for deeper ethnographic reflection on the extent to which it is possible to construct and cultivate life in the relative absence or insufficient reach of urban infrastructure. Two, it serves to substantiate the argument for everyday life in the contemporary urban moment in South Africa as being first and foremost a material experience. Once this has been ethnographically substantiated, it is possible for further engagement with the infrastructural objects as they become present in Enkanini, and the ways in which they may articulate the social and the politics arising from such experimental development strategies in the gaps that befall the State apparatus’ reach (Reeves, 2016:6).

2.4 ‘Shack Dwelling

I first met Ari in early February of 2015. I heard an unfamiliar voice outside my home in Enkanini. He had what sounded like an American accent, long brown blonde dreadlocks down to the middle of his back and a friendly, upbeat character. He was from the Netherlands

and had been visiting Enkanini since he was sixteen; his mother's NGO was involved in this space, and after meeting Zandile their working relationship solidified into friendship. Ari was using the ERC as a base from which to run a community art project with some of the kids from the settlement. Ari had become settled in Enkanini, always talking to people in the street, taking their picture or simply sharing in a joke. Feeling welcomed in this space made him want to live in Enkanini, so eventually he found a shack a friend was willing to have him stay in. The site of the shack was located in the section of Enkanini residents referred to as Idutywa, a place with the same name as a town in the Eastern Cape that looked similar in terms of its landscape.

Upon first inspection he found it to be quite derelict and unfit for living, especially with winter fast approaching. I had accompanied him to the structure one Saturday morning to see for myself whether he would be able to fashion it into a liveable space. With the wind icy as it blew across the face of the hill, we come to a standstill in front of the shack. A patch of loose grass, shrubs and weeds and some dirt surrounded the shack. It was very small and stood at a slight slant, leaning to the right. The wood had in some places started rotting and iron sheets used as a roof were rusted. Some repair work would be needed to keep the wind and rain out. We entered the structure; it was dark single room, there were no windows, the air was moist with and faint smell of mould lingering in the air. With the help of a few friends they fixed the structure, boarding up the gaps and replacing the existing roof with one that Ari deemed sufficient for providing shelter.

I found his determination to cultivate a space suitable for living as an opportunity for gathering insight into his experience. He was very excited about the opportunity to live in his own shack, but had some worries about the lack of utilities. There was no electricity, while the standing tap and bathrooms were a fair walk away. An interview conducted a few weeks after having moved into the structure reveals his experience of dwelling in his shack.

Christo: So what was your experience of living in a shack?

Ari: Its cold man! And you don't know where to shit.

Christo: Explain this situation.

Ari: My house wasn't ready for the winter and I was afraid I would get pneumonia again... For heating I would make fire in a tin can then take the coals and put it next to my bed...but I'd be worried about starting a wild fire.

(Field notes 2015)

I had visited the structure after it had been repaired. There were still some gaps in the roof and at the ends where the structure was nailed together. There was no electricity as the site was situated too far away from the neighbouring town of Kayamandi, leaving him without even an illegal power connection. In the end, Ari only lived in the shack for about a week. Reflecting upon this he speaks of the difficulties of life under such conditions. He refers to the notion of 'bearable' life in the shack. 'Bearable' life he deems to be to be a material experience. A proper bathroom, lights, and a structure that provides shelter from the elements.

Ari: Not having these things just makes life harder...Without electricity I could not cook food or move around at night. I was scared at night. The bathroom was also a problem; it is far away and uncomfortable...

Ari's understanding of his experience as difficult alludes to his socio-economic status, which allowed him to have access to the amenities which were lacking during his time spent living in Enkanini. The infrastructural norms the middle classes are exposed to render Ari's experience as wholly foreign. His understanding of the amount of work that had to go in simply to stay warm, to relieve himself and to feel safe were testament to a deeper sense of

understanding of the difficulties involved in going about one daily life. To live in a shack was a persistent struggle to feel at ease in the world.

Zandile along with his wife and 4 month old daughter had been living in Enkanini since 2010. Their house, an informal iron structure is divided up into two rooms. The front room consisted of a living room with a few chairs, a fridge, and a television. A kitchen cupboard filled with eating utensils and a microwave. The adjacent room held a double-bed, and small cupboard. They are connected to informal power so it is possible to have modern appliances, which they deem as crucial in taking care of their daughter. Zandile spent some time here with them during the course of my research stays. Here we would often sit and talk about the experience of life in Enkanini since they moved into the settlement.

Zandile: When we moved to Enkanini from Khayelitsha my wife said we cannot live without electricity so we must have informal power... we have a baby now as well to take care of.

Taking care of Isabelle* and her health is their main concern. Food needed to be kept cold, lights provided ease of movement throughout the night, television served as a means of relaxation and escape from work and daily responsibilities. However, Zandile pointed out their intention to move. "The house is not good for the baby" he says. Between the walls and the roof gaps provided room for the wind and dust to creep in. "It upsets her chest and makes her sick". Zandile's wife, Nolethu*, shares his sentiments when discussing the bearing the structure has on their quality of life. As Nolethu put it,

Here the wind comes in and Isabelle gets the flu... We may move to the ERC at the end of May. Winter time is difficult here as the water comes in when it rains too much.

These sentiments referring to the importance of a structure fit for occupation were often the topic of discussion in my encounters with people in Enkanini. Some afternoons some of the local high school boys and I would walk up to a shop that sold ‘fatcakes’ (palm sized balls of dough deep fried in oil). On one such particular visit to the shop, I was approached by a man. He spoke English with a thick Xhosa accent and without much deliberation asks me what I am doing here. My response was sincere but vague, “I am conducting research here on life in the settlement. He nods in approval and asks whether I am from the municipality. “No, I am from the University”, I reply. Without further inquiry he begins to elaborate on his experience of life in Enkanini

Anon: This place is not easy to live...we have no electricity...here the wind blows into the house at night, it makes us sick and the children are always not feeling well.

He brings his hands up to his nose while contracting and expanding his chest, simulating uneasy, heavy breathing. He continued making reference to the heat and rain that accompanies the seasons and which affect him and others in Enkanini. He then asks for my help in resolving such matters, to end the plight of people who are most affected by their external environment and the structures that are not sufficient to life.

To draw on Miller’s concern for the agency of the individual and the house, individuals come to occupy homes, but homes also occupy individuals (Miller, 2001:12). What these three ethnographic extracts reveal is a relationship between individuals and the structures they inhabit. My interlocutors’ experience of inhabiting their shacks was situated in what the shack wasn’t, what it could be, or what it should be. They became scared for their safety, they became ill, and they were concerned for the welfare of their families. The shells fashioned and in the absence of formal housing became more than symbolic representation of one’s identity as a ‘shack dweller’. In recalling what had been missing from them, my interlocutors’ explanations of the inadequacies of their living arrangements expressed a particular belief

about the world. A belief that at the very least, what is needed for a bearable life in the urban moment was house that could shield them from their environment.

2.5 Reimagining the shack

The above section made reference to living spaces constructed while waiting for the State to provide housing and utilities. Moreover, it showed that the structures erected in Enkanini were often considered as unbearable to live in, dangerous to one's health and detrimental to a decent quality of life. It is these conditions that the SI team sought to engage, and that formed the basis for the experimentation with alternatives strategies for producing bearable living spaces in Enkanini. Practically, the first consideration for the improvement of living conditions in the settlement were the very structures residents could construct without assistance from the state. This culminated in SI – through the help of funding from the Stellenbosch University – securing a site in the settlement upon which a house could be built as a way of demonstrating to residents the possibilities for material improvement.

Designed by the SI team of researchers, and built in conjunction with the some residents of Enkanini in 2010, the end product was named The Enkanini Research Centre (ERC). Zandile was always keen to give people a tour of the structure and explain not only the design principles but also the logic underlying the structures presence in Enkanini. The following extract presents our engagement after I had moved into the structure as part of my research journey in December 2014

The ERC resembled a large rectangular shack I thought. The outside of the walls covered in iron sheeting; a blue wooden door at the front of the structure and set of windows on opposite sides of it. It's a rectangular structure raised above street level by the foundation made up of old car tyres. Inside the floor consists of red bricks; I am told they were collected from dump sites. Right across from the doorway a section

of the back wall is covered in glass, making it possible for me to peer beneath the plastered walls. The innards of the walls are a mixture of clay and straw. High up in the corners of the back wall two small windows lets in natural light, illuminating the main room. The ceiling looking up a small window exposing the crumpled newspapers insulating the roof; “it keeps you cool in summer and warm in winter” says Zandile. The walls that divide the living space from the kitchen and bedroom are filled with cardboard. This provides soundproofing; “more privacy” he says...To my right another wooden door covered in posters depicting infographics...

A door to the left leads to the kitchen. It holds all the cooking and eating utensils; a gas stove with two large gas cylinders, a small cupboard used to stack drinking water containers and dry food items, large steel pots are stacked in another corner. There is a fridge, but Zandile tells me it doesn't work... “we don't have electricity”... There are no water taps visible inside the structure. In the far left corner a small gas cooker and pot is placed on the floor connected to a pipe fed through the side of the wall. From the kitchen a door to the right leads to a small room with a three quarter bed and a large cupboard.

We made our way out onto the street as Zandile smiles and remarks how the designs and building materials used in the construction of the ERC show us what a shack could be in the future, a “liveable space” as he puts. The ERC was not connected to the grid, but through the course of my research journey I was still spending my days and nights in relative comfort. At times I would ask Zandile his thoughts on the ERC – referring to the manner in which it has been built: “Sure it does not have electricity or any other utilities attached to it, but we have a saying, ‘A half a loaf is better than nothing’.

Christo: So why was this structure built here?

Zandile: The ERC was built as a way of rooting the Sustainability Institute and its researchers in Enkanini. Meetings are held here and workshops and discussion can take place. It was a demonstration of what can be done by those wishing to construct their own structures on illegal land... The logic operating here is that if people were to build on illegal land with little or no access to basic services then the structures themselves at the very least can be insulated against the heat, cold and rain and as such provide a greater sense of security and permanence for those already struggling to make a life for themselves.

Christo: And how did people respond to the ERC being built?

Zandile: Usually people living here are too shy to ask about the ERC. However, when it was being built many people who came walking past would ask about it. Some people have gone on to incorporate some of the design principles of the ERC, using some of the techniques into their own construction projects, especially the idea of old car tyres as a foundation and insulating their roofs with crumpled newspapers.

(Ari, Interview 2015)

Often members of the community came knocking in search of Zandile, He received many visitors though the course of my stays. Some were friends wanting to catch up, others were at times more formal engagements. They would always be welcomed in and if food or drink was readily available he always offered they sit down. This allowed me to engage visitors in my research. “I like it”; “the design is good”; “Sjoh, it’s nice and cool in here”, they would often remark when asked their thoughts on the ERC. However few could materially translate their thoughts on the experience of being in the ERC to their own structures. So that when questioned about their ability to mimic the design principles, some shrugged suggesting they

couldn't do it, while others such as Balethu* claimed to have incorporated some of the more readily available materials into their structures.

Balethu: I used the newspapers in the ceiling method to keep the shack nice...

Christo: Nice? Please explain.

Balethu: Yes, you know, it is not too hot now when you are in there and hopefully in winter it will keep me warm.

At times Zandile would say that the reason others, including him, did not use the design principles of the ERC was because materials were hard to source. "Not everyone can just drive to a dump or go pick up bricks" Zandile says. Regardless of the shortcomings, the very construction of the ERC made visible to residents what the possibilities for in-situ housing could be. How this was achieved was related to the ERC's aesthetic and material form. From the outside it resembled a shack, from inside it could be considered a 'conventional house', but it was neither of these. Its very design allowed it to operate in between two distinct social and material worlds. This strategy for experimenting with what homes could be in Enkanini was often made reference to as a "boundary object". Boundary objects are defined as collaborative efforts/outputs that "are both adaptable to different viewpoints and robust enough to maintain identity across them" (Star and Griesemer 1989 cited Cash et al. 2003:8089). By fashioning a structure resembling a shack but which functioned as house SI attempted to adapt the idea proper housing in the context of informal settlements without .

The above extracts illuminate that important observations were made during our discussions about the ERC and this allowed for the articulations of my analysis of the logics that underlie the structures' construction. The first relates to the ERC's appearance and the second to the agency this specific type of material structure wishes to produce. First, its shack aesthetic, blends in with the already existing structures, questioning residents' notions that a "proper

house” cannot be anything but a brick and mortar structure. The ERC’s shack appearance and the relatively accessible materials used in its construction enable the structure to exist on the boundaries of residents’ conception of the house; an attainable, habitable structure. This contributes towards re-consideration of residents understanding of distinction made between a house and a shack, which is now seen not as shoddy pieces of iron and wood, but as a permanent and liveable structure; one not provided by the state in its quest to eradicate slums, but is built from the bottom up.

The ERC as a boundary object is an experiment in the appropriation of incremental housing strategies aimed at providing informal settlement dwellers with the means by which to obtain improved living conditions without having to gain clear consensus on what such improvements could look like (Star, 2010:602). In response some residents did nothing, others admired, and a few incorporated the design principles into their existing structures.

If we were to think of how the house, a physical structure, is to be built and what that structure does for our perception of the environment, the dwelling perspective as defined by Tim Ingold’s proves useful. The ways in which we come to produce worldviews is ultimately dependent on ways in which we physically live and act in the world, and so my empirical data, and the argument I present further, is based on such claims. So much so that the descriptions of living in the ERC without electricity is not the ends, but the means by which I produce an analysis of views on everyday life at the margins.

2.6 A day in the life...

The ERC, as the rest of Enkanini’s shacks, had no formal access to the ‘grid’. My stay here therefore entailed the experience of living in the dark. Without electricity one is immediately drawn to other qualities of the environment through which to cultivate a sense of security. At least the ERC was, as Zandile expressed it, ‘liveable’. So regardless of not having electricity,

we could at least be insulated against the heat, cold and rain. Zandile would also at times point out how effective the design of the ERC is in keeping the exterior environment at bay. This I found to be true, as we often took shelter from the oppressive heat and wind that was at times unbearable, especially when caught outside in the street, as not many trees surrounded our part of the settlement allowing the wind to carry dust from the dirt road everywhere.

But the ERC was not without its shortcomings. At night, some of the local boys and I shared the living area where we would sleep on mattresses placed on the floor. The front door had a gap of about 6 cm and often the wind would blow through, disturbing the dust. At night I could hear the boys cough; in the mornings they would sniff and sneeze. I too fell to the same symptoms, as by the third day I had developed a cough, sore throat and congestion. Reflecting on this experience reiterates the importance of a structure for the cultivation of life proper; the stories of shack dwelling I encountered had even come to impact upon me directly as a result of the ERC's inadequate insulation from the elements. Eventually I covered the gap with a towel, which seemed to help ease these symptoms after a couple of days. No longer merely witness to the material conditions of Enkanini, what this extract reveals is the elimination of my own taken for granted experience of the basic material conditions of ordinary life (Povinelli, 2001:136). In this instance the material living conditions experience by Enkanini residents had come too affect me also. Under such conditions I too had to fashion daily rhythms of life, each day starting with a producing a particular set of practices that for my stay became what I could refer to as a morning routine:

Eyes open slowly; darkness...in the background the sound of peoples footsteps in the dirt road.

Awake as the boys get up to go to school – look at watch, 06:55 am.

The sun beams through the window throwing long rays of sunshine across the bed; the boys have left for school. Time to get up...

Find clothes left in corner, get dressed...

Fold away bedding.

Write in field note journal – quality of sleep, subjective state of being (health and emotional). Reread interviews and field notes from previous day. Write down thoughts that come to mind.

Go outside to use the toilet. Sometimes the bathroom key is missing which instils in me a mixture of anger and general discomfort. I become aware of my own material privileges.

Brush teeth and wash face (the water from the tap outside is so cold)...

Find key to bathroom; toilet does not flush; a slight inconvenience; still aware of my material privileges.

Zandile shows up at the ERC around 8:30am. Breakfast....

Mornings are an especially good time to take note of the practices we engage in particular contexts as the body's insistence on acting in the world allows us to render visible material practices we may otherwise see past. Sleeping on a dusty floor rather than a bed, not being able to take a shower, having to brush my teeth out in the public; these moments created an intense awareness of the impact of the arrangement of the material world has on one everyday practices. The ERC's locality coupled its limited utilities prompted be to shift my behaviours in accordance with the environment I inhabited.

By late afternoons, usually around 5:00pm the kitchen in the ERC would become a hotbed of activity as dinner started being prepared. Fresh water would be carried with a bucket from the

freestanding tap outside, usually by one of the younger children hanging about. There were no specific duties in the kitchen and some nights I would cook. After dinner had been taken we would remain seated around the table.

These after dinner conversations were always just kept to the men in and around the house. I would often be accompanied by Zandile, his younger brother Ananda*, and a friend named Siphon*. Most of the time however it would be myself, Sithole*, Yonga* and Luthi* – ‘the boys’ as I refer to them – huddled gathered around a single paraffin lamp. This was our main and only source of light, producing a tame, but warm glow, illuminating our faces, but barely reaching the corners of the room. It is quiet. There is no humming of a fridge; no sound of a television playing in the background, no talk of bathing before bed, no clattering of the dishes being washed in the sink. Without these possibilities we are left to converse, and I wish to know more about the experience of living in the dark.

Christo: Do you have electricity at your house?

They shake their heads from side to side, a brief “No”.

Christo: But how do you study?

Sithole: We do our work in the day and in the evening we just sit talk about life.

And so we did, as most nights would be spent sharing stories around the paraffin lamp until everyone felt ready for bed. This was usually no later than 9:30pm. Sometimes the boys would ask me about my life, what I do and how I do it; the ‘normal’ everyday things as they would point out. Hesitant, and not wanting to come across as insensitive toward the immediate external environment and material living conditions, I describe my dwelling.

Christo: My world looks different, I have a house; it has electricity...

Boys: So you watch TV?

Christo: No I don't, but I have a computer...I have trouble waking up sometimes so in the mornings I get and take a shower first. I switch on the bathroom light, the room immediately becoming illuminated. I move about with ease, towel hanging on a rack in arms reach of the shower, hidden from view pipes transfer water, hot and cold.

Its goes a lot quicker than bathing in the ERC I think to myself. As I explain my material living arrangements and routine I become increasingly aware of my own reliance on the grid, the ease with which a day ensues, and the invisibility of the things and infrastructures that underlie my seemingly mundane practices routines.

I reflect on bathing in Enkanini. Zandile would fetch water outside, place it in a big aluminium pot to heat on the gas stove. Once hot, he filled a large green tub with the hot water, heated the tub which was then taken to the bedroom of the ERC and placed on a chair in the middle of the floor. With a cloth and a bar of soap one would wash oneself. Afterwards the remaining water, now a grey murky colour, would be thrown out into the street, joining, streams of black water running down the hill of the settlement. It smelled putrid and often people referred to it as dangerous.

I struggled to keep up with this bathing routine. How accustomed I had become to the ritual of bathing as one of relative ease and comfort. Not only did I have a room in my house dedicated to bathing, it also housed the infrastructures that allowed hot water to be produced, transported toward me and effortlessly poured over my body, flowing down into the drain... *I don't know where it goes exactly.*

These routines, along with other seemingly mundane practices, contextual spaces and objects escape those living in Enkanini. Without grid infrastructures, the conventional utilities which are relied upon for the production of the everyday are not present in Enkanini. After all, infrastructures are the "material frontline of the norms that define 'modernity' and as such

come to form part of the “modernist ideal of the equally serviced city” (Redfield 2012, Marvin 2001 cited in Larkin, 2013). Enkanini was thus neither serviced nor modern, leaving its members to cultivate precarious livelihoods from the little material resources available. It would not be impossible to live here, neither completely unbearable, but it would not be considered “good enough” in Enkanini or the contemporary urban middle class milieu. The presence of the ERC, however, did provide an example of an alternative material basis for the improvement of the quality of life in Enkanini, albeit still short of the claims we make to “proper life” in the serviced city.

2.7 Conclusion

In this chapter I examined the consequences of the absence of the material norms of urban modernity – formal housing, basic services and utilities in Enkanini. The chapter also focused on the objects, narratives and material logics of life in Enkanini in relation to ethnographic and theoretical debates. As Daniel Miller argues, “what we are exists not through our conscious or body, but as an exterior environment that habituates and prompts us” (Miller, 2004:5). Taking this as a theoretical point of departure, what we are and our belonging to the world is understood as an active process that drives us to construct and cultivate our external environment, and not as modern thought has led us to believe, as merely our inhabitation in a world already built (Ingold 2000:185). Such a claim – that of building being circumscribed in dwelling –draws attention to the construction and cultivation of forms of life, real or imagined, as practical engagements with our environment, and not as givens to which we are passively subjected (Ingold, 2000:185-186). Or rather, as Ingold (2000:179) claims, “worlds are made before they are lived in...so acts of dwelling precede acts of worldmaking”.

In the current post-development moment of the global South, there is wide ranging debate concerning what constitutes ‘proper’ and adequate material norms for the provision of life (Redfield 2012; Larkin 2013; Gupta 2015; Redfield and Robins 2015). Such ideals include

formal housing and now, more than ever, a supply of constant electricity (Gupta 2015; Anand 2015). Both the provision of housing and electricity can be decontextualized as items within the discussion of a politics of development (Miller 1998:8). So in n waiting for formal housing and grid infrastructure, the prevalence of slums and informal settlements throughout the global South is evidence of people rarely standing by idly when having to construct and cultivate life. Regardless of their circumstances; even when my interlocutors would articulate how it is “the states responsibility to give us these things” they came to produce material structures that filled the barren landscape and cultivated living spaces even in the face of the settlements illegality.

Moreover, in challenging state housing policy, SI came to experiment with new configurations of dwelling in informal settlements that do not adhere to the image of the conventional house, nor the ubiquitous shack in its material form and symbolic purpose. Life within it came to be bearable, but still lacked the full claim to a proper house with its utilities and services. Now the question of what could improve the lives of shack dwellers under the auspices of the UISP and housing policy reform gave way to ideas and efforts focused upon alternative strategies for the provision of electricity in the absence of the state.

Recent literatures reflecting on the contributions of the anthropology of electricity have called for greater ethnographic attention to those spaces and places yet to be, or in the process of becoming electrified. As it has been argued, consideration of living without the grid could very well lead to the opening of new trajectories through which to ask, as Gupta (2015) does, about the normative assumptions relating to the perceived necessity and desirability of wanting to be connected to the grid. Now more than ever, questioning the grid’s allure in the context of post-colonial South Africa becomes one of immense importance to our understanding of strategies for sustained transformation of informal and slums as liveable

spaces that stretch beyond the normative claims for blanket coverage of the grid - a high modernist dream of an 'infinite' supply of energy.

This chapter has provided the context for the ethnographic exploration of development alternatives to housing and basic infrastructures in the settlement of Enkanini. First, by highlighting the conditions under which the settlement of Enkanini was established and in so doing exploring claims to what entails "proper" life. Second, it revealed the difficulties of living in the absence of housing and grid infrastructures. Third it introduced the possibilities for development that could arise in the absence of the state. And lastly it provided thick ethnographic descriptions of my interlocutors and my own experience of everyday life in the settlement. In doing so this chapter is an attempt at providing context to the ensuing experiments that would come to reimagine the shape of improvement in the settlement of Enkanini

Chapter Three –Electric Futures

3.1 The Promise of the Grid

The wires zigzagging from Kayamandi to Enkanini are wrapped around tree branches and old pieces of wood propped up as make shift poles against fences and shacks. In some places so many wires cross paths along the way that they resemble multicolour 'birds' nests', but without any sense of clear pattern of splitting once more and travelling down into the aluminium boxes adjacent to the homes located in Kayamandi.

Wires represent the slight penetration via illegal conduits of power, but regardless of this, every night Enkanini disappears from view and with it the promise of the sensual qualities electricity provides. From the veranda of the ERC one can only hear the shuffling of feet, muffled voices, here and there a speck of light leaking from illegally electrified shacks. Looking down into the town of Stellenbosch, its width and breadth brightly illuminated resembling an almost symmetrically organised milky way on a dark night. To my back lay the town of Kayamandi, and although the shacks hinder sight of the settlement, an eerie orange glow emanates from its location; just enough for one to take notice of the ensuing darkness that is representative of disparity...

The wires make visible the marked difference between those living in Kayamandi who enjoy access to the grid, those in Enkanini situated close enough to tap into the grid, and the rest who are wholly excluded from its glow.

The early 20th century saw rapid urbanization and industrialization that resulted in required reforms to the management of cities so as to bring about positive changes to the health and wellbeing of its inhabitant and the environment (Pincetl, 2016:70). This period of reforms in

the North came to be referred to as the ‘progressive era’ (See Hays 1959, Weibe 1967, Pincetl 1999 cited in Pincetl 2016:71). Culminating into what has been deemed the modern city, this era of reforms ushered in the creation of the networked city with its extensive grid infrastructures of water, waste management, electricity and telecommunications that would act as mediators in the perpetual expansion and progress of the city and its inhabitants (Graham and Marvin, 2001 cited in Pincetl 2016:72). What it means to be a ‘modern’ urban city dweller – at least by normative Western standards – is based on access to the infrastructures that make life possible. However, the acknowledgement of these infrastructures ability to expand cities’ capacity for upholding life must be taken with an acceptance of its shortcomings. For these networked infrastructures – or grids – have at times failed to reach those considered as unauthorised urban populations, specifically in the Global South where a growing urban slum population is unable to afford access to commercially privatised grids, or are simply deemed unserviceable on account of their illegal settlement status (Davis, 2004). In some cases grids and infrastructures are not simply denied, but instead become ‘splintered’, either by way uneven access to the ‘universal service for all’ model, or in the construction of ‘premium spaces’ that move beyond from the standardised heritage of ‘modern’ infrastructures (Graham and Marvin 2001 cited in Baruah, 2016:151)

According to Lemaire (2011:278), South Africa enjoys well over 74% grid electrification penetration, but this still leaves almost a quarter of the population without access to electricity, either on account of settlements’ locality, or lack of land tenure as is the case in Enkanini. Rather than being serviced by the grid like the rest of Stellenbosch and Kayamandi, Enkanini is partly served by infrastructural nodes. Here water and sanitation come in the form of freestanding taps and ablution block toilets that have been provided by the local municipality. The distribution of these services and their infrastructures in Enkanini has left residents maligned, but their main concern has been the lack of access to electricity ever since

the settlement's establishment in 2006. The promises of the modern city characterised by water, electricity and sanitation services – what Marvin and Graham (2001) refer to as the “modern infrastructural ideal” with its grid-like form and infinite possibilities escape Enkanini, resulting in residents adopting a variety of strategies to fulfil their energy needs. In *The Politics and Poetics of Infrastructure* (2013), Brian Larkin discusses what he refers to as “the unbearable modernity of infrastructure”. This notion claims the conceptual underpinning of infrastructure as having its roots in “the Enlightenment idea of a world in movement, open to change because of the possibility for a circulation of goods, ideas and people that allow for endless human progress” (Mattelburg, 1996, 2001; cited in Larkin, 2013:332).

In the absence of electricity, fuel sources such as paraffin, coal, gas and candles used for cooking, heating and lighting are the norm, but these are also hazardous to one's health. An example of this would be Sewa's* paraffin stove and the noxious gases that would gather in his home as he cooked a meal. Upon entering his shack, the smell of paraffin hung in the air like dense and suffocating cloud, and the door remains its only source of ventilation. My eyes would water slightly and my lungs felt heavy whenever I was in the shack while he cooked. Globally, three billion people still rely on solid fuels for cooking, with an estimated two million deaths each year associated with exposure to these fumes (UN- Energy, 2016). However, for some living in Enkanini, the longing for grid electricity culminated in illegal means for the procurement the promise of a clean, safe and unlimited energy supply.

Zandile's shack is situated close to a narrow dirt road that serves as thoroughfare between Enkanini and the neighbouring settlement of Kayamandi. Often interlocutors would refer to Kayamandi, describing it as ‘better off’ and ‘well looked after’ by the local municipality on account of their access to the grid. At times, those staying in Enkanini would move across to Kayamandi if they could afford to pay for accommodation and services such as water and electricity which was available in government houses and apartment blocks. Those few in

close proximity to Kayamandi could also tap into its grid through installing an illegal electricity connection via a wire from a power source in Kayamandi.

Sitting in Zandile's shack the wire enters through a small gap between the roof and the wall, tapering down along the far corner and attaching to a multi-plug which supplies power to a fridge, television, microwave oven and an array of mobile phone chargers; a computer placed on a chair next to the fridge acts also acts a work station. From here Zandile can type up documents and send emails.

Christo: ...why do you think it so important to have electricity?

Zandile: "It makes things easier"...I can watch television and at night I have light. So I have illegal power.

Zandile explains that informal power is expensive, between R300 and R500 per month depending on who your 'supplier' is.

Christo: So are you happy with it [informal power]?

Zandile: You know, I like it. You must have these things [referring to his fridge and television]. It is better than just having a shack, because at least now I can take better care of myself and my family....

Christo: What about the promise of Enkanini being electrified?

Zandile: "We can't wait for electricity to come from the government...If I have to live in a shack then at least I want to have electricity".

Christo: What do you like most about having electricity?

Zandile: I have power whenever I want so my things work. I don't have to worry about my phone dying or food becoming rotten.

From the outside Zandile's shack resembled a box. A satellite dish connected to the side of the structure, the shack is made up of thin aluminium sheets, a set of windows and a single wooden door. It is small, and during summer can become extremely hot and humid. Nolethu, his wife, tells me about the rain water that floods in during the rainy season, and how the wind enters during the night, causing their daughter to become ill. Nevertheless, once inside, the presence of electricity creates a familiar sensual experience. We often spent time here as a way of escaping the heat and relative boredom of township life, especially at night when it was deemed dangerous to walk about. Inside, the fridge kept the food and drinks fresh, a fan would gently cool our faces, and on the television an isiXhosa soap opera usually played. In these moments, electricity's power not only gave life to the objects that fill Zandile's shack, but also mediated the experience of living in spaces of material deprivation, allowing for these conditions, albeit momentarily, to recede from one's mind.

The experience of living in Enkanini without electricity demonstrated how its desirability and enabling capabilities outweighed any consideration for how it is produced or where it comes from. As Gupta (2015:578) remarks, the grid's presence in its current iteration is the status quo our urban populations have become accustomed to, and hence its desirability is rarely questioned, even in the face of the consequence of ecological degradation that accompany its expansion. This inherent normative understanding of electricity as being readily available, and able to flow anywhere, reliably and without fail, when its power is channelled via networks of wires and switches, stems from what Boyer (2015:533) refers to as 'baseload thinking'. Baseload thinking, Boyer claims, is that "mass-ness of electrical demand at the level of region or nation...represented by conventional energy grids enabled by carbon and nuclear fuel" (2015:533).

In Enkanini the desire for the grid remained palpable. As long as municipal officials and local social movement groups such as the Kayamandi Development Forum (KDF), provided

narratives of land re-zoning and electrification, the promise of the grid to Enkanini remained intact. So, whereas the town of Stellenbosch and settlement of Kayamandi are considered ‘locked in’ – tied to the standard urban infrastructure grid – Enkanini residents, although not receiving such services, remain tied to the ideology of ‘base-load thinking’.

The argument highlighted here outlines the problematic nature of the modernist ideal. The idea of the modern city has become based on the establishment of water, sewerage and electricity grids that carry the resources needed for upholding modern urban life. The city, first and foremost, has become the locale that is serviced by ‘modern’ infrastructures that includes water, sanitation, housing and electricity running from centralised stations of production, transferred via a vast network of pipes and wires directly to consumers. But for all its promise of equal access and progressiveness, the centralised grid has failed to deliver on its ‘universal service to all’, while also contributing to the ecological degradation of the environment in the pursuit and neat orderly and ‘hygienic’ cities. Moreover, the grid is under physical strain as its material nature leaks, bends, and cracks and falls apart. As roads, water pipes and electric wires are eroded by the elements, are poorly maintained by utility corporations, neglected by States and tampered with by ‘rogue civilians’ – the ‘modern infrastructural ideal’ of centralised grids – has come under increasing threat (Jackson, 2014:222).

Allowing ourselves some distance from these forms of baseload thinking and infrastructural ideals and desires, the realization of their failed promises and deficiencies allow us to critically reflect on their presence as inherently unstable material and ideological entities. If our present normative understanding of the grid and its infrastructures has become unattainable, unsustainable and unimaginable, then what do we perceive the future of grids to be, or rather what lies beyond it? How is energy to be produced, transferred and consumed in the cities of the future? Such questions become increasingly relevant in the present context of

increased global urbanization. Current urbanisation trends will not only see the further expansion of cities as 4.6 billion people - 60% of the world's population - gather in cities by 2025, but this will further exacerbate the prevalence of urban slum settlements as an estimated 2 billion people will find refuge in such spaces by 2040 (Singh, 2012:61). We know now that cities will be the spaces that the majority of us we will come to inhabit in the future, but how will urban environments across the globe adapt to growing demands for the services and grid infrastructures that uphold life? The concern has thus shifted from where we will live? To how will we live?

3.2 Beyond the grid

In *Retrofitting Cities: Priorities, governance and experimentation*, Hodson and Marvin (2016:1) highlight the critical challenge of contemporary urbanism as a question of how cities are to “develop the knowledge and capability to systematically re-engineer their built environments and infrastructure in response to climate change, economic constraints and policy drivers”. They raise two questions regarding this process of systemic change. One, “what is to be done to the city (technical knowledge, targets, technological options); and two, how will it be implemented (institutions, governance)” (Hodson and Marvin 2106:1). Development and transitions literature concerning the sustainability of ‘future cities’ in the global North have become attuned to the reimagining of the urban environment as an evolutionary process involving localised socio-technical experiments concerning the re-engineering of urban landscapes and its infrastructure grids; defined by the process of ‘urban retrofitting’ and driven by state and non-state actors situated in the context of urban transitional spaces (Beatley 2007; Evans & Karvonen 2011; Nevens et al. 2013 ed. Hodson & Marvin 2016). This evolution of cities, and their transition toward future ideals, is to be

understood as “societal processes of fundamental changes in culture structure and practice” (Frantzeskaki and de Haan, 2009 cited in Nevens et al 2013:112).

By moving beyond the base-load electricity grid, the provision of sustainable energy will require dramatic shifts in our normative assumptions of its sociotechnical form, its governing institutions, as well as overall generation and consumption practices. In short, we are being forced to accept, and take notice of our human agency - in this epoch known as Anthropocene -as the main geological force that is shaping the earth, which is characterised by immense ecological and bio-social strain, political contestation, and economic uncertainty, each impacting on our ability to change the behaviours and practices that permit ecological degradation and perpetuate social inequality (Latour, 2014:4). In this moment it is cities that will become the focal point of endeavours for change. With a focus on the global North, authors such as Beatley (2007) provide evidence exemplifying the birth of urban futures in cases of cities taking up strategies aimed at powering urban landscapes via sustainable energy. He refers to these localised experimental responses to the development of sustainable cities as ‘Solar cities’, defined as spaces:

“striving to produce energy, food, and materials locally; to be carbon-neutral; to incorporate solar energy intrinsically into design; to use renewable energy in green infrastructure; to have substantial amounts of their energy and material needs provided from waste streams; and to build a local economy with a unique and special sense of place” (Beatley, 2007:32-33).

These ‘Solar cities’ are conceived of as utopian visions of a future urban ideal, but, as Beatley (2007) demonstrates, pilots of some of these initiatives have attempted to create entirely new urban landscapes. Attempts at bringing about futures that extend beyond centralised base-load electricity generation and consumption provide the basis for the transition toward sustainable cities. Cases of solar power ranging from Berlin to Chicago effectively stand as

practical examples of the onset of a low carbon transition that sees the redesign and reconfiguration of infrastructure networks taking hold in cities across the global North (Beatley, 2007:34). As Bulkeley et al. (2011:24) writes, “The notion of a low carbon transition is beguilingly simple. We use too much of the wrong sort of energy. We need to use the right sort of energy, and we need to use less of it” It would seem that the call for the switch to a lower carbon future is being reinforced by the recognition of urban environments as the primary spaces for the implementation of low-carbon transitions aimed at long lasting solutions for mitigating climate change via a variety of sustainable practices (Bulkeley et al. 2011 cited in Nevens et al. 2013: 112; Evans & Karvonen, 2011:).

In light of these developments, Buckeley et al (2011:26) have commented on the growing interest of low-carbon agendas for the cities of the global South, where there remains the need for greater focus upon strategies used as a means of increasing the resilience of urban populations hampered by scarce access to resources and infrastructure networks. However, they note that a lack of comparative research that has been done in developing countries, with “limited evidence on which to assess how, why and with what effect experimentation is emerging in these context”(Buckeley et al 2011:27).

Through ethnographic exploration and anthropological analysis, I now turn to an explication of a case that serves to fill some gaps in the literature on energy access and sustainable transitions in the global south. In light of Buckeley et al. (2011), the call for evidence assessing the how, why and what of transitions and experimentation is presented here as a hyper-local development initiative aimed at the creation of a low cost energy institution.

3.3 How to improve a shack

Through daily engagements with my informants and SI collaborators, it was often made clear how Enkanini was to be considered a ‘grey area’, not formally recognised by the state as a

viable space for constructing a permanent settlement, and yet still allowed to continue to exist. SI's engagement with the Enkanini rested upon engaging with government policy surrounding the upgrading of informal settlements and improving the quality of life of residents. SI had initially engaged the community through the construction of the ERC, an ecologically sensible and lasting structure that aimed at reconfiguring the material norms of housing in "illegal" informal settlements. However, with no further state institutional and financial backing, the ERC remained the only building of its kind in Enkanini to be piloted. Materially, there was no denying the superiority of the ERC structure in terms of in keeping the elements at bay. By comparison, the shacks constructed in Enkanini resembled nothing more than flimsy, leaky tins. Yet, as far as "boundary objects" go, it was to remain an unstable entity in its abstraction, perceived, spoken off and pointed toward, but never fully adopted as a viable alternative to formal, commoditised housing delivery via the state.

If formal or alternative housing, whether state-led or otherwise was not an option in upgrading the settlement, then staying true to the incremental change mantra of 'upgrading existing top structures' would be the pragmatic approach taken. In turn, for SI the solutions for the amelioration of living conditions for residents in Enkanini became centred on experiments with infrastructures as a means of upgrading individual shack dwellings. SI experimented with three infrastructural projects hoping that this could alleviate the material conditions through initiatives which centred on improvements in sanitation, waste management and electricity provision (Swilling et al. 2011). Although each of these projects encapsulates ways of providing improved living conditions to informal settlement spaces, the lack of access to electricity remained the greatest concern for residents and their livelihoods. As such I focus on the experiments with infrastructure as means for the provision of electricity via the establishment of a micro-grid solar power initiative known as the 'iShack Project'.

My first encounter with Mark Swilling in April of 2014 made me cognisant of the unfolding experiments in in-situ upgrading that were taking place in Enkanini. He described to me the outcome of his research teams' engagement with the question of "what can be done while people are waiting" for housing. With funding received from the National Research Foundation [NRF] as part of a "community engagement research grant" and with research conducted by Andreas Keller, a masters' student at Stellenbosch University's Sustainability Institute, the Institute focused on dealing with "energy poverty" in the settlement. From this engagement sprung what came to be referred to as the 'iShack' – an 'improved' shack (Swilling et al. 2011). Initial experiments surrounding what could constitute an improved shack were, as Swilling put it, "mundane changes" to the structure that included improved insulation, a slanted roof and overhang for the eventual catchment of rain water, and a reorientation that promoted protection from extreme weather conditions. It also featured a solar power system designed specifically for shacks and could power lights, television and minor electronic devices. Lauren Tavener-Smith, a co-researcher involved in the project, explains how the 'iShack' started out as a "physical intervention" with the aim of such an experiment to "introduce incremental upgrades to existing shacks" (Wild, 2012; Tavener-Smith 2013) Furthermore she highlights that the key aspect of the first 'iShack' structure was its use of solar photovoltaic and direct-current micro grids for the provision of safe affordable energy (Tavener-Smith 2013). Since the construction of the first fully fledged iShack in 2012, the main focus became the use solar as a means of demonstrating how 'green technologies' can be used for incrementally upgrading informal settlements while at the same time increasing the resilience of communities by building local enterprise capacity (Sustainability institute.net, 2016).

This radical redesign of what a shack could be caught the attention of major news media sources nationally and abroad. Some were eager to relay a story of a new hope brought to

informal settlement dwellers' perceived uncomfortable existence, while others questioned the project as a means of highlighting housing delivery failures. Headlines such as 'Feeling more at home in an iShack', 'iShack is a home full of hope', 'iShack - upgrading housing in South Africa', 'Could alternatives ease the misery of South Africa's housing crisis?' exemplified this possible alternative to conventional development approaches (Dericks, 2012; Pardee, 2014; Smith 2012). These headlines reflect a resounding interest and optimism in what could be deemed a future vision of change, but what was the effect of this project on the ground in Enkanini and its residents.

What was yet to be engaged is how to affect improvement in the long term and at a scale that could improve, not just individual shacks, but Enkanini as a whole? At the level of the social, the aim was to transform living conditions in the long term through the establishment of a business model that could deliver a low-cost energy service to residents of unserved urban spaces. Funding provided by the Bill and Melinda Gates Foundation [\$250 000] and The Green Fund helped to pilot the first one hundred systems and October 2013 saw the rollout of the iShack solar power systems via the 'iShack Project' (Dericks, 2012).

3.4 The iShack Project

By October 2014 I was preparing to enter the field so as to gain experiential knowledge regarding the iShack Project, which at that stage had been in operation for a year. Attending the Science for Society Seminar Series served as a means of further capturing the narratives surrounding the on-going process of experimentation and transition toward low-cost solar energy. At one such seminar Mark Swilling was presenting on the iShack Project. Swilling drew specific attention to the factors involved in the design and implementation of the Project, not simply in terms of being technically innovative, but also as a means for

contributing to social change. The innovation referred to was explained by Swilling as stemming from the challenge of retrofitting shacks. “Each shack is different” he said. With some design changes made by the project’s research partner and solar power systems supplier Sun Solar Systems, these infrastructures were redesigned so as to be attached to any existing shack structure. However, “innovation had to be tied to having an effect on living conditions”; it had to be ‘socially innovative’ (Swilling, 2014). The recognition of the challenge of how to deliver such a technical system as well as maintaining it was explored with the help of the co-researchers who came to establish a working model for making delivery possible to scale. From there an iShack project operating system took the form of an iShack energy hub. This physical structure would serve as a point of contact between residents and operators – called iShack agents – who would market, install and maintain the Solar Multigrid system (Swilling et al. 2011). According to Swilling (2013) the main prerogative in setting up this structure was to circumvent any notions of a hand-out and to produce “safe off-grid energy that generates a revenue flow that partly covers the operations and maintenance of the system”. What was thus needed for the continuous roll out of these systems was to bring it to market; to turn rightful citizens into paying customers so as to establish new and novel ways of governing the poor and the worlds in which they are situated.

The iShack Project had thus been born, and with it came a wholly new frame through which to delineate future aspiration and dependence in the city. Considering Pieterse’s (2014:92) prediction of what an alternate development trajectory would entail in the context of the African urban slum, the iShack Project represents an example of a ‘post-postmodern’ articulation of institutional and regulatory times to come. What this shift will entail is not “the disappearance of regulatory and transmission institutions”, such as the state, local municipalities and privatised commercial energy providers such as ESKOM, but rather:

“The birth of new institutional forms with novel regimes of governmentality to provide a sense of ordering, interaction and futurity. And these institutions will have to mould themselves to the dual and inter-dependent imperatives of decentralized production and consumption, embedded in a transnational culture of selective globalism and aspiration.” (Pieterse, 2014:92-93)

Taking stock of the waves of such transitions in the context of African urbanism, Pieterse (2014:92) acknowledges that the entering of a period of transition that includes technological shifts will bring to our attention “new found material-social-cultural articulations, that remain at best, obscure in our urban discourses”. The establishment of the iShack Project allows us the space in which to study the interaction between technologies and the socio-material alternations it will produce and, in turn, start dissolving some of the obscurities surrounding the futures being produced at the present in informal settlements such as Enkanini. Therefore, a reading of the literatures surrounding carbon transitions, future imaginaries and reports on experimental development initiatives are only useful in as far as it gives a representation of the institutional forms and governance strategies, sociotechnical systems engaged and rationalities promoted. What it does not provide are insights into the finer, detailed nuances accompanying the materiality of such systems as it weaves its way through the social flux and political contestation that accompany everyday life in a settlement such as Enkanini (Pieterse, 2014:92). That is, unless we start to reflect on and critically engage with contemporary problems of the city “through the explicit engagement with the futures that are rising up around us” (Pieterse, 2014:93).

Thus far I have attempted a brief summary of the iShack Project as encountered through a number of sources including my engagement with Swilling, the founder of the project, media reports ranging from 2012 to 2014, literature published by SI researchers involved in the implementation of the iShack, and web sources such as the Sustainability Institute website.

What these engagements made clear is that the iShack Project is a process of experimentation with sociotechnical infrastructures. It is not just a means for addressing energy poverty and building capacity for resilience against the shortcomings of state-led housing and services. Instead, it is also as a means to disrupt notions of development and modernity, which still cling to the provision of the conventional infrastructural ideal. We find that in the contemporary urban moment the reality is that such development practices are not in line with the trajectories that need to be taken in order to establish the improved living conditions of the urban poor. This does not mean development will not take place, but rather that out of these recognitions of the failures of “modernity at large”, arises new found ways of assembling the urban landscape we inhabit.

An example of this is the iShack a two-pronged strategy for development. One, being the upgrading of individual shack dwellings via incremental upgrades via infrastructure, and two being the establishment of a business model that could instantiate a transition toward the establishment of a low-cost energy institution, which is unheard of in the South African context. These levels of the technical-material and the social are not separated, but intertwined in ways that produce outcomes that stretch beyond the immediacies of material deprivation and into wholly new social and political landscapes.

Constructing an analysis of this multiplicity firstly requires some conceptualisation of solar power grids, their material form and relational qualities. From an anthropological perspective it becomes useful to think of such projects and systems as ‘infrastructural’ – not mere technical and material forms, but sociotechnical assemblages consisting of “arrangements of people, things, ideas and materials that make up technological systems” (Harvey and Knox 2015:5). What this understanding of infrastructures as sociotechnical systems suggests is that they have a ‘more-than-material’ relational quality (Harvey and Knox 2015:5) As such infrastructures are not just ‘things’, but are also the relation between things (Larkin,

2013:329) Such an approach allows for the recognition of the relation between human and non-human actors as mutually contrived.

Moreover, this awareness allow us to question how technologies and infrastructures can serve as tools for transitions toward alternate, material, social and political realities in urban informal settlement spaces such as Enkanini. However, although the narratives of iShack coming into material existence is an example for what is possible in negating the problem of ‘wait’, material existence and representations of improvement do not establish clear indications of the forms of social organisation and politics that spring from such interventions and experiments with infrastructures. Nor is it able to show to what effect infrastructures mobilise social and political transitions in the on-going struggle for material gains in illegal informal settlements such as Enkanini. As de Certeau points out “the presence and circulation of a representation tell us nothing of what it is for the user (de Certeau,1984:xi). After all, retrofitting infrastructures is never simply a technical challenge – requiring the application of technology such as solar to already existing urban fabrics at a particular scale – but it is also “a social process in which technologies are adopted, accommodated and altered by urban actors” (Dowling et al. 2016:213-214 in ed. hodson). As such it is important to trace the actors – researchers, technicians and end- users - and their heterogeneous relations that allow or disallow the iShack as a stable ‘working’ entity. Such an understanding of upgrades and retrofitting forces the need for an account of the interplay between the technical and the social factors, as well as the actors –researchers, technicians and end-users - involved in the various levels of the system. Doing so may open up grounds for a critical discussion and reflection regarding the discursive risks and gaps that exist within our understanding of the outcomes and consequences of intervening in lives spent in waiting while also resisting normative claims to the stability and ease of transitions.

In articulating the outcomes of the iShack Project, I turn toward my ethnographic subjects – both the human and non-human – and observations and descriptions of the narratives, practices, ways of seeing; doing and imagining my subjects employ so as to unravel the multi-layered, contested and often unruly dynamics of solar power electrification in Enkanini. After all, even disruptions such as solar power become at times disrupted. Ethnographic moments captured during field work conducted in Enkanini between November 2014 and May 2015 delve into the day-to-day operations of implementing and adopting solar power as an infrastructure in Enkanini.

3.5 Infrastructure as Accretion

Anand (2016) writes about infrastructures as accretions, attributing infrastructures as being unsteady human and non-human relations of “discourses, materials, practices, and technologies that actively need to be bound together through techno-political projects”. Moreover, as infrastructures are grafted onto already existing worlds, they become embedded in socio-material histories, temporalities and precarities that either hinder or enable their ability bring into being the futures they seek to mobilise (Anand, 2016). Infrastructures are thus orientated toward “enabling mobility for the future”, but “their ability to do so depends on already-existing social-material contexts in which they are embedded” (Anand, 2016). Drawing on the conception of infrastructure as accretion, this section explores the temporalities and precarities the iShack Project encounters in its attempt at establishing a low-cost energy infrastructure via solar power in the context of Enkanini.

Unruly and unstable things

In the kitchen a large grey rectangular box is attached to the wall; Its LED screen flashes values between 8 and 13 at random. Zandile told me that this was the first iteration of the watt meters to be installed on the iShack solar power system. They were as he referred to it ‘experimental’ and that the one I was looking at did not function.

Researcher: What do they do? Referring to the watt meters.

Zandile: “They are supposed to tell you how much power the system is generating”...

Probing Zandile further, I ask about the iShack.

Zandile: “The iShack was supposed to be a whole structure but it had to become business orientated in order to make money, so it went just with solar”.

Christo: For what?

Zandile: For keeping the project running

Christo: But does it work the iShack?

Zandile: “I don’t think it works in the long run”

Christo: Why?

Zandile: “There are informal power connections”

What the above description reveals are the various relations of the material, social and political economy of development entangled in the proper functioning of an iShack solar system and the Project’s long term goal of bringing the solar power to scale. Technological systems sometimes breakdown. Proper maintenance and repair is a key factor in regards to sustainable transitions, but requires strategies that are commercially viable in order for such services to continue. And, there remains a strong desire and – illegal – means for procuring the grid which could hinder iShacks’ attempts at scaling the project beyond experimentation, with niche sociotechnical systems toward a transition toward renewable, decentralised energy regimes. The following ethnographic excerpts made up of interviews, participant observation

and ‘go-alongs’ unpacks, and brings to the fore, these factors and their relations as they emerge from the field.

Solar possibilities

Two houses up from the ERC stood the ‘iShack hub’. The structure is made up of a wooden frame and corrugated iron sheet. From the street one can see attached to the roof a billboard advertising the iShack solar power systems. A family of three are gathered in a living room. The mother and father are watching television while their son does his homework underneath a bright light. It reads: ‘Fumana iSolar Yakho Namhlanje’. The English translation says ‘Get your solar today’. A Further brief explanation in English gives a description of the possibilities of solar power. ‘Light up your home and enjoy TV with solar electricity.’



In front of the iShack hub stand a yellow sign is located at the side of the road in close vicinity to the hub. It explains the process through which one can become an iShack client:

1. Apply with at least one neighbour. This helps to spread interest in the system
2. Fill out a registration form. Informal, undocumented shack dwellers now become clients if they sign – ‘legitimacy’
3. Pay installation fee – people are paying for a service



4. System will be installed once one is next on the waiting list
5. Pay your monthly fee and enjoy solar electricity

During the course of my research journey the hub became a place for the gathering of ethnographic data surrounding on the daily organisational operations and the technical systems it oversaw. For the purpose of exploring some of the material realities, narratives, practices and strategies which come to stabilise and disrupt the technical functioning and ideological presence of the iShack Project, I had organised go-alongs’ with its technicians who install and maintain these grids. As an ethnographic research tool, go-alongs’ offered the

possibility of combining the strengths of ethnographic observations and interviewing by accompanying iShack technicians and interlocutors on their ‘natural’ outings. Delamont (2003:12) considers the go-along as method useful for “actively exploring subjects stream of experiences and practices as they move through, and interact with, their physical and social environment” Delamont (2003:12).

I meet Derick the technical operations manager who oversaw the daily operations of the hub, and Dane*, Phuzo* and Vick*, the iShack technicians in charge of installation, maintenance and repair work. I was to accompany Dane and Phuzo on their rounds for the day. Heading down into the settlement, at the bottom of the hill, a small river cuts through the settlement. Along the river shacks stand no more than two or three steps from the water’s edge. Dane comments on this “In winter all this is flooded” pointing toward the shacks we pass. Reaching the house, we enter after a neighbour unlocked the door. Many people here have jobs so are not home during the day Derick says. “This makes it hard sometimes to get into people’s homes so we can do our job”. Once inside they get to work as I probe them about the system.

Christo: So what do I receive when I sign up for an iShack system?

Dane: The system comes with two lights inside the home, two cell phone charger sockets, a light outside and a television.

Christo: Are people happy with the system after it has been installed?

Dane: “I would say 90% of people enjoy the system”

Christo: Is it just the household who use the system?

Dane: No, shebeens [local, often illegal, drinking establishments] here in Enkanini use it as well. They use it with informal electricity. They use iShack for lights and etc. When Eskom switches off the power then they have solar as a backup and so clients do not leave.

Christo: What do you like about it?

Phuzo: “It saves money, it is a lot safer. There are less shack fires and there are no harmful smells or fumes”.

Christo: What else?

Phuzo: “It is entertainment and lights for R5 a day. Candles are R3 a day. So you can do many things.”

Christo: And for Enkanini as a whole. What does it bring to the settlement?

Phuzo: It is safe. The children are benefitting. They can watch T.V and spend more time indoors away from the dangers of the community.

Breakdown and Repair

As we head toward the home of a client, a woman standing outside her shack becomes animated when seeing us. In Xhosa she shouts a few phrases toward us. Dane and Phuzo acknowledge her, saying something back as we pass.

Christo: What did the women say?

Dane: She was saying that her system is cut off and she does not want it anymore.

Christo: What could be the reason for her not wanting the system anymore?

Dane: “Her battery went flat”

We reach our first stop. Explaining the purpose of our visit, Dane says he has to perform a ‘battery check’. The solar panel on the roof would charge a battery which then powered the television and lights. Dane points to the watt meter and starts to explain “at 12.2 volts the system stops charging, at 11.5 volts system cuts off”. This is to save the battery, he says. “In winter the systems cuts out often as the charge rate drops”. Phuzo interjects, “In winter people must take care of their batteries”. Dane goes on to explain that the batteries are designed for solar. These are 12V 10 amp batteries. It is enough power, but clients do not use it correctly”.

Christo: What do you mean by “use correctly”?

Dane: The T.V consumes the most power, but clients do not switch off the TV and then the power cuts off.

Dane: The charge controller controls power usage in the system. The battery reports to the charge controller. 12.6 volts and the system are charged properly. You can watch T.V If it shows 12.4 volts that means the battery is going ‘down’ (not being charged with enough power) so you must switch of the TV to save the battery. If you don’t do this you drain the battery and damage it permanently.

Dane tests the battery.

Christo: What is the damage?

Dane: 35% of the battery is damaged. So our biggest problem is clients hurting the battery. That is why we tell them to “love your battery”! That is our motto...

To Love your Battery

When arriving back at the hub from the go-along, I had more questions regarding the ‘love of the battery’ motto Dane spoke of. What type of ‘love’ had to be applied to the battery for the proper function of the system? Approaching Derick he explains their strategy for managing the lives of the batteries placed in users’ care.

Christo: I was told that you encourage iShack clients to ‘love your battery’. What does loving the battery look like in practice?

Derick: In practice it means no appliances must be used during the day, so it’s mostly for night time use...but it also depends on the seasons. In summer there is no problem because the system is always charging, but in winter this becomes a problem. So we have to continuously educate people.

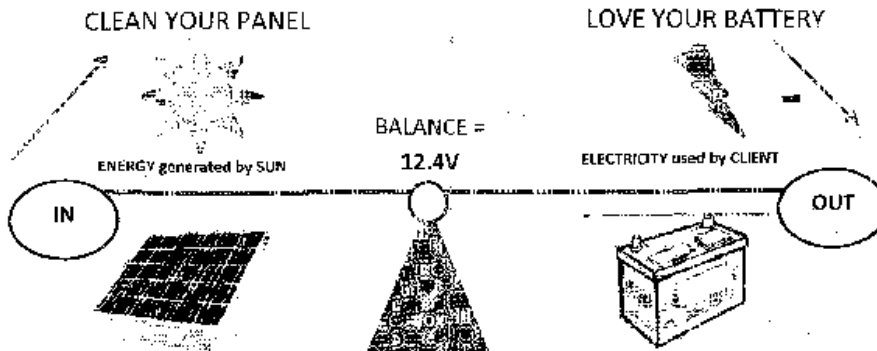
Christo: If clients do not love their battery then what happens to it? How do you deal with this situation?

Derick: If a client calls in a complaint about their battery we test it. If it is flat, we can charge it. If we find it to be damaged beyond repair, then we have to fine clients. They signed a contract which stipulates that they have to take care of the system...So It is up to clients to manage their systems and power use...So we say to them “love your battery”...If it is going flat then leave it to charge for a day before using it again...There are rules to using the system...So the problem is that some people do not know the limits of solar. You can't watch television if the system is not charging properly. You have to know how to balance energy production and consumption and this is their responsibility.

Derick hands me a yellow A4 flyer they hand out to clients who sign up. It reads “Understand Your System” and includes a brief explanation of what the iShack solar power system is, a diagram depicting the system as a scale, instructions on how to take care of the system, how to do a battery health check and what procedures need to be followed if one is experiencing a ‘low battery’.

UNDERSTAND YOUR SYSTEM

The iShack Solar system has a panel that takes energy and stores it in the battery for the client to use. The system is like a scale which must always be in balance. The balance must be between the energy that the panel generates and the electricity that is used from the battery. You need to be a SMART SOLAR CLIENT to always have enough electricity when you need it. The DB Box tells you which side of the scale your system is on - follow the **Battery Health Test** to be sure.



TAKE CARE OF YOUR SYSTEM

CLEAN YOUR PANEL		LOVE YOUR BATTERY	
Wash your panel often	At least once a month with soapy water & dry it off afterwards.	Use less electricity in winter	You will have less electricity in winter compared to summer - use less electricity!
Trim any branches that shade	Cut branches, clear shrubs and small trees	Use less electricity on cloudy & rainy days	Only use 2 hours of TV if there was enough sun.
Check for plastic packets	Remove plastic packets or other things shading the panel	Never touch the yellow & purple fuses	Touching fuses can stop your system from charging
Never touch the panel cable	Touching the panel cable can stop the system from charging	Monitor your children	Never let your children use the system when you are not there!

BATTERY HEALTH TEST

1. Wait for night time to do this test.
2. Switch Off All Appliances: No TV, No Lights, No Music or Cellphone
3. Check the time and wait for 15 minutes (DON'T DO THIS QUICKER!)
4. Switch on only the light by the DB Box
5. Check the DB BOX LCD Screen for the Battery reading:
 - a. Below 12.4V, then you can only use lights only
 - b. Above 12.4V, then you can use the TV

"BATTERY LOW": What to do?

- Clean your panel
- Only watch TV for maximum 1 day
- Only use lights at night
- Make sure your children don't use the system
- Never Tamper with the System
- DO YOUR OWN BATTERY HEALTH TEST

Always call the project if you need help on 071 527 1370. NEVER FIX SOMETHING YOURSELF. This is tampering, and the project will fine you.

IS-108W-WI3-21 (Client Low Battery Handout) v1.1

© iShack Project

What this reveals is that the proper functioning of the iShack systems depend on a particular set of practices between end-users and the system that are entangled in material and social relations. The iShack solar power system is not simply a device and service provided and held stable via an invisible network of infrastructures and technical experts. Instead, users come to be entangled in the systems' operation via having to 'love the battery'. However, this responsibility toward their systems, especially in regards to the battery's wellbeing, stretches beyond purely material relations. PV solar panels' that collect energy from the sun which is

then stored in a battery for consumption was already a relation in flux given how that the seasons and day light hours affected the battery's charge capacity. What stands out above this relationship is the level of care that had to be applied to the system in order to have enough energy when it was most needed. One had to consistently be aware of the energy in/energy out relationship as it was the responsibility of end-user to manage their consumption patterns in relation the amount of charge the battery was receiving.

However, this scale would not always be in equilibrium on account of the social realities facing users, which at times stretched beyond iShack agents' ability to educate people about the solar power systems. What is needed to truly care for the battery, even beyond material practices such as cleaning the solar panels, is a sacrifice of the desire for the grid and its "infinite" flow of energy. So to love the battery is to employ a particular set of behaviours that imply an understanding and acceptance of not just the systems limits, but also end-users behaviour as the outcome of the desire for the grid. In thinking around how objects shape habits Miller (2009:4) reflects upon what he terms 'the humility of objects', that is, "the ability of material things to establish the frame of proper behaviour without us noticing that they inhabit this powerful role". In this instance having to love ones battery was a sign of the iShack solar power system not being as humble as had been hoped, because users did notice how the systems proper functioning relied not only on its technical aspects, but also on users' behaviour toward it.

Regardless of this, the iShack never made any promises of an infinite amount of energy to be used, as and how one pleases. This was the promise of the grid. Instead, what had been provided was an improvement on that which had previously been unattainable to most living in Enkanini; clean, affordable, but limited supply of electricity. Nevertheless, the iShack as being inscribed with the humility Miller refers too remained a key aspect missing from its

presence. It was too present, too visible to blend seamlessly into the background of residents' experience of everyday life in Enkanini.

Limitations and Technofixes

As we continue conversing, a young woman enters the hub. She addresses Derick. She explains that her system is not working, "it is dead". Derick responds to her claims of the systems' demise, "One can only watch television for a certain period of the day so I don't think there is anything wrong with the system". They ask her to log the fault and she leaves. Dane turns to Derick in discussion about the encounter.

Dane: I have seen a child there during the day...It is school holidays now so she is alone at home...She watches television all day long and then drains the battery, so when her mother gets home there is no power.

Christo: If there are these problems with solar then why do people choose to use it?

Derick: People choose solar power because they have ideas of what it does [refers to middle class people looking to install solar on the basis of sustainability and efficiency] ...But the system has limitations, so in Enkanini the system provides a finite amount of electricity per day and thus requires education and understanding from the client in terms of how to use the system and work with limitations...renewable energy is for some a lifestyle choice, but in Enkanini it is the only option available and accessible to all, but there are these limitations.

Recalling an informal interview conducted in April of 2015 with Brian, an SI researcher who frequented Enkanini and was involved in conducting other infrastructural experiments, I follow up on the 'love your battery' campaign. He explains how that the 'love your battery' campaign was not as successful as they had hoped. Asking him to explain he had this to say.

Brian: You see with ESKOM they control users' behaviour through pricing. However, the iShack controls user behaviour through its limitations and technical design...But people are paying for a service so it becomes tricky [referring to their behaviour toward the system]. They know of shack fires, but they get solar to put on a switch...

Brian: Ons moet kan leer deur tegnologie...Dis te idealisties om mense te probeer opvoed (We will have to learn through technology...It is too idealistic to try and educate people)...So we have issues with educating people on systems, so I think behaviour change is possible through technology.

The methods for curbing damage to the battery, and not having to rely as much on users' adherence to the principles of care that Brian was referring to, are explored in interactions with Derick at the iShack hub. He describes to me the techniques for managing the technical stability and proper functioning of these systems in light of end-users desires for power and the limits of solar.

Derick: There are different components to the system...and we are developing technologies as we go along.

Christo: Can you give me an example of this?

Derick: This is things like the 'low voltage disconnect'. It cuts off the system in order to save the battery... The system cuts off when the charge reaches 11.5 Volts, but this annoys them [referring to end-users]. But this is only to save the battery and not to control people's consumption habits.

To which Derick later adds in somewhat contradictory fashion. "The charge controller is used to save the battery and to stop people from using more than they want". Regarding the regulation of behaviour via a technological object as a means for governing populations, von Schnitzler (2008) demonstrates how that water meters - as technical devices for monitoring water usage and wastage – had produced a new kind of citizenship in the township of Soweto. Her research found that the water meters was not only a means of regulating water

consumption, but through becoming involved in practices of calculation, users were made into self-regulating individuals, who were responsible for their own actions. The water meter had been installed as a means of governing, instilling in citizens a new ethics that delivered a new moral behaviour as well as water (von Schnitzler, 2008:906).

In regards to the iShack, the system cut-off function represented the same logic employed by officials in the provision of water to Soweto. The iShack would not only have to produce energy if solar power were to become the norm for the provision of electricity in Enkanini. The system itself would also have to act toward its users as a means curbing the desire for excess energy consumption. For the iShack solar power systems to function within its limits, as my interlocutors have described, the technology would have to shape users behaviour, and how the iShack would achieve this is through a technical specification referred to as ‘low-voltage disconnect’ function that is built into each system. Considering the limitations of the solar power systems, this function was justified because for the iShack project, it merely represented their concern for saving the battery and cutting service and repair costs. However, in some instances users could not love their batteries even if they wanted to, and at other times there was no love at all for this object.

3.5 Anticipation and Disillusion

In my on-going interactions with iShack technicians over the course of the research, I learnt of that the solar systems were, as part of a strategy toward its permanence, designed to be scalable. This meant that other than the promise of lights and television, experiments with Direct Current (DC) fridges were to result in the extension of the range of possibilities of solar.

Dane: iShack can be permanent – It wants to improve. Our goal is to provide 1500 systems to the settlement, and so far we have ...The next phase includes a fridge, which is another step in improving the lives of residents.

This initiative fell in line with some of my informants' claims that in order for the iShack system to take the place of the grid, there was a need for solar energy to be able to be used for fridges and stoves. These objects were often linked to notions of a better system, and maybe even an improved experience of life.

In February of 2015 the first of two solar fridges arrived as pilot models. It resembled any other fridge one would find in homes across the globe. It was, as Derick pointed out, energy efficient in that it used less power than a conventional fridge because of the way it was designed. It had LED lights that provide light and runs off two batteries and two extra solar panels installed on the roof and it can be retrofitted to the existing iShack system. Wanting to know more about the technical challenges facing the successful integration of the fridge, I asked Derick to elaborate on this.

Derick: the ambient temperature outside will determine the temperature inside the fridge [referring to the temperature inside shacks]

Christo: And in terms of it being attached to existing iShack?

Derick: The fridge does however add another layer of complexity to the system.

Christo: How exactly?

Derick: The structures will be packed with solar panels and you will need to install another battery.

Christo: When will you make these fridges available to the community?

Derick: We will make the first ten fridges available around June or July to interested clients. Thereafter it will be made available to any iShack client.

The iShack Project sought to expand the number of appliances its systems could run. If solar power could provide enough energy to power home appliances it could spell the end of the grid. Therefore the introduction of the fridge not only offered an example of the scalability of solar power infrastructure itself, but gestured toward low-carbon energy systems ability to provide one with the amenities of the grid. Clearly for the iShack the goal was not simply to provide users with renewable energy, but also to set in motion a transition to an alternative energy future through experimentation with future capacities of solar power. The iShack project, as an infrastructure that can be materially and technically scaled, comes to gesture toward the possibility of an energy future as secure as the grid itself. Drawing on Reeves (2016:7) discussion of the temporal rationalities of infrastructures she notes that, “Infrastructures point to alternative futures not yet brought into being” and thus their emergence can at times become “the locus of anticipation“, of futures that may be more prosperous and secure than the present (Reeves, 2016:7).

The sun had already started setting when I came to hear of the power cut. Load-shedding had been implemented on the neighbouring town of Kayamandi, which meant that many residents in Enkanini who had relied on informal power for electricity had also now been struck by the State’s ability to forego access to electricity via the grid. Ananda and I took a walk up to the spaza shop wanting to buy some candles. Upon arrival the shop was a hive of activity, people all queuing in order to buy candles for the dark night ahead. As we stand in line waiting our turn to be served, I am approached by an elderly Man who questions me about the power outage.

The details surrounding our conversation remain fuzzy, but I recall him asking me to tell him when the lights would go back on. I tell him that I simply do not know, but that tonight we are all drenched in darkness. We pay for the candles and make our

way back to the ERC. The sun had set, and looking across the settlement, as if covered in a blanket of darkness, small white lights twinkled like stars. Tonight those with solar power had lights and television. In this moment of grid failure, the possibility of a solar future in Enkanini shined brightest.

This ethnographic extract reveals to us is that the centralised grid is not as stable as it is made out to be. Rather than being ubiquitous, the centralised grid and its infrastructures can at any moment collapse, be switched off, and fail us. It is in these moments that our longings, desires and beliefs of its ample and infinite supply are confronted. What this produces are doubts about the grid's capacity to provide us with a constant and unlimited source of energy. As the promises of the grid become further exposed, the possibilities for alternative energy sources that power our cities will have to become the norm. In referring back to Pieterse (2014), what will be needed are new forms of regulatory frames and institutions, including those such as the iShack Project, which dare to imagine ways of bypassing a dependence on the grid in the most unlikely, and yet increasingly relevant of places in the cities of the future – the urban slum.

Accounting for the grids absence and moments in which it fails, the iShack Projects' provision of solar power to Enkanini could be claimed as a development victory, but as my interlocutors narratives and the literature reveal, the provision of infrastructures, regardless of its form, is the amalgamation of heterogeneous and unstable human and non-human relations that at any moment threaten the stability of any attempts at creating constant flows of energy.

This chapter has sought to introduce and discuss two axioms of infrastructure and development in the contemporary urban moment. The first, the desire for the modern city with its centralised infrastructure grids exemplified the normative path of development that cities across the globe had strived toward this past century. However, as has been shown, the modern infrastructural ideal of universal access to services and centralised grid

infrastructures has had to be rethought in the wake of the failures to bring about ‘modernity at large’ in its material form. With the grid no longer considered the ideal to be striven for, this ushered in calls for a new paradigm that transcends centralised networks of infrastructure and baseload provision of electricity.

The second axiom regards a move beyond the promise of the grid toward a low-carbon and renewable energy future the new ideal for development and infrastructure provision. In the global North this process is already underway at the scale of the city and even the nation. However, in the global South, a shift beyond the norms of the centralised grid remains fraught with precarities that extend beyond material and technical challenges. As an example of this, the provision of solar power infrastructure in Enkanini via the iShack project has sought to illuminate the complex and heterogeneous human and non-human relations that make up the creation of working infrastructures in the absence of the state – alternative or otherwise.

It would seem that to improve shacks requires more than the application of experimental technologies and energy regimes technology and the providing of infrastructure. Instead the technical properties of solar power and the new social worlds it wishes to bring into being is constantly having to contend with individual agencies and collective desire, discourses and practice steeped in and stretching beyond what is considered the norm. What this suggest the literature reviewed confirms; to improve the lives of residents of Enkanini through the retrofitting of shacks with solar power remain a viable option, but is not without challenges that are inherent within infrastructures as socio-technical amalgamations. The future of development in Enkanini is indeed electric, but tensions, disruptions and contestation on account of its design and technical functioning continue to affect attempts at reconfiguring the normative desires of the grid and a transition toward a low-cost energy institution.

Chapter Four – The iShack and its Politics

“A light is the product of a positive and a negative”

4.1 The Making of an ‘Apolitical’ Infrastructure

Chapter three had ethnographically described the iShack as a niche sociotechnical system aimed at establishing a low cost energy institution. In the process, retrofitting shacks with solar power showcased a viable option for providing electricity and improving the experience of living in a shack, although the project was not without its precarities. This was demonstrated through the provision of various strands of ethnographic data, which highlighted the material and ideological labour involved in embedding infrastructures in a life world deprived of the most basic of infrastructures (Anand, 2015). What had also been suggested, but not thoroughly explored was the shape of politics and the political outcomes that underpinned the iShack Projects’ presence in Enkanini. This chapter navigates these politics with the consideration that infrastructures are never neutral conduits for the provision of services, nor self-enclosed ‘black boxes’, but tied up in the political aspiration capable of fashioning particular subjectivities (von Schnitzler 2008, Graham 2010 cited in Baruah, 2016; von Schnitzler 2016,)

Since the start of the research journey the iShack Project had been framed as an ‘apolitical’ effort for providing Enkanini residents with electricity. This claim was presented to me during my first interaction with Mark Swilling in April of 2014. Thereafter this claim to the ‘apolitical’ delivery of services was repeatedly made by iShack technicians and representatives throughout the research journey. Rather than being used as a mere semantic device, Derick, the operations manager, explained that “installing solar power systems and then having people pay for the service is a way of insulating the iShack Project against the politics of electrification in Enkanini”. He continues, “Because people are renting the

system, people are being provided a service in the form of infrastructures that we install and maintain"...so they become clients [and] solar has nothing to do with politics".

One of the researchers involved in the establishment of the iShack Project helped to further elaborate on this strategy. According to Brian, "When you live in a shack you have no address, but becoming an iShack client gives you a legally binding contract...it gives you a sense of belonging. You are then no longer just a shack dweller, but a client". This notion of belonging seemed out of place. What were residents belonging to when paying a non-state entity for the provision of a public good? Do these identities of 'shack dweller' and 'client' ever overlap, to which Brian responded: "There is some flexibility in the relation between the iShack and politics in Enkanini ... "You see, on the streets it is about politics, but in the shacks it's about solar energy..."

Firstly, Dericks' framing of the iShack reveals that rather than simply claiming that the project is not tied to politics, the iShack Project strategically de-politicises the delivery of electricity by creating 'customers who become part of a relationship of market exchange. Replacing the state as the provider of public goods with a private entity that would install and maintain the infrastructures that provided electricity is, according to von Schnitzler, part of a process that involves the production of a 'customer relationship', which is essentially tied to an increasingly neoliberal logic (von Schnitzler 2008:913). Paying for the use of the system and service is part of what von Schnitzler (2008:13) argues is "a relationship of market exchange rather than one of rights and obligations". For the iShack, the logic was that creating consumers of a product and service would avoid any political entanglements and disputes amongst residents in the settlement.

Second, Brian's claims distinguish between the public sphere and the private sphere as separate entities. The public sphere is considered to be the realm in which politics is waged, and the private sphere he considers to be void of any sort of politics. The outcome of the

rationalities indicate how that the iShack as an infrastructure could be understood as an ‘enabling technology’ that created a fiscal relationship between the project and residents that would effectively create affiliations situated in the logic of the market, thereby creating consumers of a product rather than beneficiaries of the state.

However, claims to be providing ‘apolitical’ infrastructure had to be approached with caution. Firstly, an approach to delivery tied to the privatisation and commodification of public goods may be an expression of neoliberal rationalities, but this does not mean that there is a complete retreat of the state in favour of the ‘invisible hand’ of the market (Marais, 2011). Second, simply applying a neoliberal logic of the market and in so producing an ‘apolitical’ framing of the delivery of solar power leaves little room for a consideration of the history of development and the provision of infrastructures in South Africa. Anand (2015:3) notes how “infrastructures are grafted onto existing worlds”, and in this process the integrative ambitions of any infrastructure – whether roads, pipes, rails or wires - “are always having to contend with prior geographies and previous histories of connectivity” (Harvey and Knox, 2015:52).

Such a conceptualisation of infrastructure allows us to consider that service delivery and infrastructure in South Africa has to be understood in relation to the historical-political context of Apartheid. Development and infrastructures in South Africa have a political history rooted in the tradition of indirect rule that focused on maintaining groups based on race and ethnicity (Mandani, 1996 cited in von Schnitzler, 2016:23). Under Apartheid rule, political and administrative decentralisation served as a means of political power and was used as an instrument for the control of populations and racial division (Bardhan, 2005:202). With a particular focus on infrastructure, von Schnitzler (2016) has shown how that “apartheid as a state project was brought into being and secured by infrastructural modalities of power” whereby the racial policies of apartheid were made functional through the

segregation of spaces, the impeding and prompting of movement, and through the administration of populations. Infrastructures could thus police mobility and produce a racial economy, and in this way the state used infrastructures not for the support of a non-racial public, but rather as a means of preventing such a public from coming into being (von Schnitzler 2015). Especially in townships, infrastructures such as water and electricity would be provided in forms that helped to strategically govern townships (von Schnitzler, 2008:909).

In Enkanini the process of development and the delivery of electricity via the iShack project – even as a non-state entity - was at times identified as “a white man’s invention”, implemented for the purpose of profiting from the situation. In another instance, an Enkanini resident tried stopping Ari and some of the local boys painting of a block of municipal toilets in what seemed to be an expression of anger and resistance towards so called “outsiders” who dared come into the settlement and “do whatever they want” without first consulting with the ‘community’. As a moment of ‘othering’, the man’s utterances could be best understood as a means of disregarding the legitimacy of claims to improvement and change made by outside parties. Moreover, this response of the Enkanini resident captured the sentiment of those living in informal settlements without basic infrastructures and services; it also reflected frustrations at the lack of state-led development.

The history of the development in South Africa and the use infrastructures as political tools for domination and liberation are both complex. The iShacks’ approach to basic services was a purposeful attempt at neutralising what could be a volatile political landscape to navigate. Whether or not it was possible to remain outside the realm of the politics surrounding service delivery and provision of infrastructure remained a valid question to contend with.

4.2 The Face of the State

Interlocutors often revealed to me the need for the state's presence when speaking of development and the provision of services in Enkanini. Local politics took the shape of claims made toward the state. Phuzo explains how improvement of conditions in Enkanini is considered as tied to the administrative process of government and the presence of officials in their community. According to Phuzo, "People don't want a specific person to say X Y Z is going to be done...They want to see persons from the municipality...When people see a municipal delegation they see it as a sign of change to come... They want to see the face of the State". These calls for seeing the state echoes what Dubbeld (2013) has uncovered in his research on governance in Kwazulu-Natal. Writing on the aspects of state presence in post-apartheid South Africa, Dubbeld (2013) addresses ethnographically how the state is seen by his interlocutors and how the state comes to see people of Glendale. What his research makes clear is that even though housing and basic infrastructures have been delivered there remains an emphasis on the on the state as absent in its duties. In this instance calls for the states presence is argued as being tied to various expectations of how the state should function. For my interlocutors in Enkanini, the state is tied to its duty to deliver on the promises of post-apartheid development – it had to deliver housing and basic infrastructures.

The state as developmental actor, and recognition of the government's role in the delivery of services, was further substantiated in an interview with Sewa*. Sewa is a 30 year old male who had been living in the settlement for three years after having migrating from the Eastern Cape in search of work and basic services that he had not been afforded in the rural hinterlands. Sitting in his home, which is a patchwork of aluminium and wood, Sewa spoke about the presence of the iShack in the absence of the state, "You know, every year before elections the government comes and makes promises to us. They say, 'We will give you electricity, we will give you water and toilets'. But then after elections they break their

promises, they disappear. I am angry because we were promised houses, we were promised electricity by the government and instead we get things from outside that are second best". I ask Sewa to clarify this statement, to which he responds, "Yes, second best because you cannot cook with it, you cannot store food and you make other people rich, but you know we have a saying, a half a loaf of bread is better than none".

The iShack as a second best solution and "outside" provider of electricity is shared in many of my other interlocutors' utterances when discussing the iShacks' presence in the settlement. "We did not vote for them...We voted for our government... They should be giving us electricity" he claimed. To simply trust and wait for the state would not ameliorate living conditions in Enkanini. Yet, even amidst these conditions many people still longed for state-led development and the promises of the grid and not the attempts made by non-state development actors. For my interlocutors, to not be affiliated with the local municipality or national government is to be considered an "outsider", or rather, a less worthy actor of development.

In contrast to these claims, there is recognition of the inability of the state as a development actor. As Zandile claims. "Politics is a dead game... Too many politicians come here and make promises before election, but afterward they do not deliver on their promises...So people should not expect political parties to do things for them". What had started to reveal itself as the research journey unfolded were the differences in local understandings of what development in Enkanini should look like? There were also different conceptions of who ought to be the legitimate distributor of public goods such as electricity.

For some Enkanini residents, the visibility of the state mattered, while their absence became questioned, either as a way of reinforcing the notion of the right to state-led development and services, or as recognition of the lack of political will. South Africa as 'developmental state' is considered an administrative state that can execute its promises regarding service delivery

as a means of uplifting the poor and marginalised (Levin 2004 cited in Lennan, 2007:15). However, this could not be guaranteed and, as is the case in Enkanini, the state rather came to act as the facilitator of good business environments in which private actors could provide to the individual through the mechanisms of the market (Lennan, 2007).

The iShack Project took this approach as a means of circumventing the politics of land tenure and the illegitimacy of Enkanini as a settlement. But if the market sanctioned the presence of the iShack Project as an ‘apolitical’ infrastructure, then the project would have to maintain its services solely through the forces of the market and thus be reliant on residents’ full co-operation in the adoption of the system. In time the state would come to feature as a part of the iShack Project’s on-going attempt at creating a stable infrastructure capable of facilitating a transition towards low-cost renewable energy. To what extent and effect is further elaborated upon.

4.3 Free Basic Electricity

In South Africa there exists no right to electricity or energy provision, but rather it is implied in the right of access to housing (The South African Constitution, 1996). In 2003 the South African government implemented a policy that provided free basic services in the form of water, sanitation and electricity to poor households – provided these households are connected to the national grid. The FBE grant could be considered as part of progressive realisation qualification contained in The Constitution of the Republic of South Africa (1996) (Chenwi, 2013:743). This instrument recognises that “socioeconomic rights have to be realised over time and that the progress toward full realisation is dependent of available resources (Chenwi, 2013:743). In short this tool ensured that the state had to strive toward the fulfilment of socioeconomic rights to the maximum extent possible, of which the FBE was one such attempt at providing citizens with resources (Chenwi, 2013:743) The FBE policy

would provide each qualifying household with 50KWh of electricity per month. Those households who were not connected to the grid yet, and running off-grid systems, would receive an 80% subsidy off the monthly services fees, which amounted to about R48 per month (South Africa Department of Minerals and Energy, 2003:14; Adam, 2010:14)

Enkanini's illegality as a settlement meant that no formal housing could be delivered. Moreover, the informality of the existing structures meant that neither could the national grid be extended. Thus, not only were residents denied access to grid infrastructure, but were also unable to receive the free basic services that came with it. Once again residents were being cut off from the state's reach via policy, which left residents increasingly frustrated with the state as development actor.

Since the iShack Projects' inception in April of 2013 there had been a steady increase in the adoption of the iShack solar systems amongst residents in the settlement. As the state seemingly hovered in the background, the iShack Project had continued to install iShack systems and aimed to reach their installation target of a thousand-five-hundred systems. Once this total had been achieved the project would be able to be brought to scale on account of it becoming economically self-sustaining in the long term as service cost would be covered by end-user fees. However, having installed nine-hundred systems by march 2015, funding had to be sourced from elsewhere for the project to remain active until it could become self-sustaining.

Derick reveals how the iShack Project, with the support of the local municipality, had been granted the Free Basic Electricity [FBE] subsidy. For each client that signed up for the solar electricity service, the iShack would be paid a monthly fee. He explains,

Currently we are able to be active because we receive the free basic electricity grant [FBE] in the form of direct funding from national government... At the moment this is what keeps us running... The FBE thus flows through us and makes it possible for

us to intervene and improve lives... Rather than increasing the monthly service fee, negotiation between the iShack actors and local government municipality culminated in the securing of a R46 subsidy from National government as a way of recognizing the rights of citizens to the access of the FBE Subsidy.

For the iShack this was a minor victory, not only because it allowed the continuation of the project, but it also demonstrated how a partnership between state and non-state entities could help to establish swift and adequate acknowledgement of their role in improving the lives of its citizens. However, rather than the state and the iShack Project being two distinct avenues for development and basic service delivery, the FBE grant provided as a monetary subsidy to the iShack Project incorporated the government as a stakeholder into the initiative. This relationship kept the project running, but meant that any political neutrality secured on account of the project being guided by the logic of the market dissolved when National government became involved as a stakeholder in the future of solar power and service delivery in Enkanini.

Unmasking the politics that defines development in South Africa, Lennan (2007) focuses on the interaction between the state and other institutions and their impact on the production and distribution of social goods in attempts at creating a developmental state. What she reveals is that service delivery in Post-apartheid South Africa, even when it is adopted in order to uphold the rationale of sustainable development, remains political. As Lennan (2007:6-7) states:

Delivery is political because it implies the use of institutionalised power through the state to ensure the effective management of resources for development. It involves complex relationships between the stakeholders of any particular sector; structural, normative and regulatory frameworks; and the distribution and utilisation of power and authority networks which legitimate resource distribution and development.

The claims of the iShack project as being an ‘apolitical’ infrastructure dissolve because without the distribution of resources state resources such as FBE, development in Enkanini would not be able to take place. In this instance, the face of the state was made slightly more visible through becoming an actor in the delivery of solar power. Subsequently, their involvement not only subsidised the delivery of an off-grid non-state infrastructure, but also lent support to the idea that in the interim the easiest solution for the upgrade of Enkanini would be solar power rather than the grid, as it represented a viable strategy under the BNG and its agenda for the incremental upgrading of informal settlements.

4.4 Development and its Frictions

Being more than just sociotechnical assemblages that function to enable the circulation of goods, infrastructures are to be understood as amalgamations of heterogeneous and unequal encounters between various human, non-human, and institutional actors, and their stability as working infrastructures are the result of “relationships or an infinite regress of relationships” (Bateson, 1978:249 cited in Star, 1999:379; Tsing, 2005:5). Because they are the work of multiple disjunctive elements whose formation is incremental, and often dissynchronous, they remain inherently unstable entities (Anand, 2015). The iShack Project as realised through the encounters and interactions of fragmentations of state housing and free basic service policy, experimental sociotechnical systems and neoliberal logics tied to service delivery, and residents’ claims to the state, would always remain in flux. These fragments and their amalgamations produced contesting, contradicting, and challenging discourses and practices that threatened the stabilisation of the iShack as a low cost energy institution. What these various actors produce is what Tsing (2005:5) aptly conceptualises as ‘frictions’. The entanglements of housing policy, the FBE grant, solar power technology, and neoliberal logics of service delivery are fragments of the greater whole that creates, stabilise and stretch

the ability of the iShack to function as a stable and working infrastructure. The usefulness of frictions as an analytical framing is that it allows for the exploration of new arrangements of power that arise from heterogeneous and uneven relations amongst actors engagements with one another (Tsing 2005:5) As Jensen and Morita argue, the shape of politics is not only a determining force of infrastructure, but amongst the outcomes of infrastructural experiments, because infrastructures ‘integrate a multiplicity of disjunctive elements’ and ‘spin out new relations’ (Jensen and Morita 2016 cited in Reeves, 2016:6). What Reeves (2016:6) draws from their point is that:

Infrastructures are ‘political’ not just in the sense that they materialise particular political aspirations with more or less success, but also because they have the capacity to articulate the social in unexpected ways: fostering particular publics defined by differentiated access or differentiated membership; or to constitute a (temporary) political community through desire for, or rejection of, a particular infrastructural experiment.

Drawing on this idea the iShack is understood, not only as the outcome of the shape of development politics already present in Enkanini, but as part of new relations that are spun out, creating its own politics that opens up new grounds on which residents come to question their relation to the state.

In August of 2015 I had made a visit to Zandile in order to to catch up on the on-going developments of the iShack Project. Three months had passed since the iShack had secured the FBE grant from national government and I wanted to find out how this partnership was received by residents. Zandile informed me of the events that transpired over the course of a weekend on the 7th of July 2015. “Did you hear what happened to the iShack hub?” he asked as I listened closely at the unfolding events. It was during election times - a tense period usually involving political demonstrations and claims being made amongst Enkanini residents

to the state. A group of residents from the section of the settlement he referred to as Zone O had organised an illegal march toward the offices of the councillor claiming that government, and in this case the local municipality, should be providing grid electricity to which they are entitled. What started off as a march to the councillor offices quickly turned into violent protest aimed at vandalising the iShack hub. In the heat of the moment stones were thrown through the windows and the solar panels that ran the battery charging stations and the new experimental direct current fridge were all destroyed.

On the 13th of July 2015 the iShack Project sent out a social media post explaining the events that had unfolded that day. What it explained was that the iShack had been vandalised and that they could not ascertain whether this act was directly linked to the earlier “demonstrations”, and that a handful of “thugs” did not represent a “community” response (iShack Project 2015, para. 4). The language used in this explanation obscures whether this event was in fact political. Neither a demonstration of resistance against the iShack Project nor a ‘service delivery protest’ aimed at government, this act was not framed along the lines of “impatient” claims to material needs and rights, but merely reduced to an apolitical form - an act of vandalism (von Schnitzler, 2008:6)

Our conversation continued as Zandile explained how he became of target of this group’s discontent. “They were saying I am a white spy, they were claiming that I make money off of them and that the reason no electricity has been awarded to the settlement was because of the local municipality taking the money from National government and giving it to the iShack.” Could this event been avoided I asked Zandile. He replied, “Yes, I told the iShack people that there were rumours going around that the iShack are taking the money that many felt belonged to them, but they did not listen, they did not engage the community and now we are not certain whether the project could continue”. Zandile also elaborated on the claims made by the demonstrators. “They said that the presence of iShack is the reason they still sit

without grid electricity and only once it is removed will their demands be acknowledged.” Their claims to the partnership between the iShack and National government implied that the State was responsible for public goods and that this was not the responsibility of non-state actors.

We walked over to the damaged structure and upon arrival found the iShack hub boarded up and abandoned. On the front door was a sheet of paper describing the event: “The iShack Project is subsidised by National government, and that any forms of resistance that jeopardises the efforts of the iShack project would result in the ceasing of funding.” As of that day the iShack Project focused only on maintenance of existing systems with no new systems having being installed. However what stood out in this message was that it is now up to community to decide what they wanted: Would they accept the iShack Project initiative, its logics of the market and State support via the FBE grant, or would they be waiting on State-led development? With this statement the metaphorical ball was now in the community’s court; choose between receiving what was considered a 2nd best solution to the difficulties of providing access to the grid, or simply wait for the grid to arrive in a continued state of material uncertainty.

On the notions of rights in relation to development and rehabilitation processes, Chatterjee (2004:68-69) makes the distinction between *rights* as being attached to those who have legal titles to land or buildings and are thus considered proper citizens, and those who do not have these rights. In Enkanini, rather than having the ability to claim rights to the grid, their unauthorised occupation of the land forced them to have to wait for the state to decide what type of services and infrastructure it would provide. This however does not mean that politics are foregone in the absence of ones rights as a citizen.

The demonstration served as an example of the ability of residents to engage the state even in its absence. What are thus highlighted here are not only claims of rights, but also the notion

of politics being rooted within Enkanini regardless of resident's illegal status and claims to the 'apolitical' delivery of solar power infrastructure. Locating politics beyond the sphere of 'civil society' itself, Chatterjee (2004:60) demonstrates how political claims to the state can be made in registers of administration and population which "stretch and bend" the rules of engagement and allows politics to be negotiated in wholly new spaces. 'Civil society', according to Chatterjee entails the "closed association of modern elite groups, sequestered from the wider popular life, walled up within enclaves of civic freedom and rational law" (Chatterjee, 2004:4). On the other hand, 'political society' is made up of a population not fully recognised by the state as proper members of civil society, but who regardless, are having to be governed by governmental or non-governmental agencies (Chatterjee, 2004:38). As is the case in Enkanini, the activities surrounding the provision of solar power brought residents into a political relationship and created a 'political society' who would engage the state through demonstration.

Therefore, the unrest circling the presence of the iShack as an infrastructure articulates a politics arising from and contested via so-called "apolitical" administrative forms tied to basic service delivery. In effect this concern about the delivery of basic services turns the settlement of Enkanini, the shacks in which people reside, and the infrastructures they provided and denied, into sites and objects through which to question notions of rights, recognition and belonging. Politics thus became waged regardless of residents now having to make do with what was provided. So what these frictions surrounding desire for the grid and the provision of solar power uncovered was that infrastructures mattered not simply because they circulate or restrict access to goods, but because they gesture towards serious questions of whose responsibility it is to provide basic services and infrastructures, what forms they should take, and ultimately what ends they serve (von Schnitzler 2016). The following

section compares the logics of the grid and solar power in order to account for the broader political aspiration embedded within them and the subjectivities they create.

4.5 Dependence and Autonomy

For infrastructures to not be tied to any political aspirations is for it to be understood only as a substrate – a network of wires, pipes, roads, rails and electric power plants – which by definition is invisible and part of a background of other kinds of work (Star, 1999:380). This common envisioning of infrastructures as invisible entities reduces its conceptual power and hinders the exploration of the importance of infrastructures in constituting political engagement between citizens and the state (Mitchell, 2011; von Schnitzler 2013). In her research surrounding the provision of water meters in Soweto, von Schnitzler (2008:900) suggests that in South Africa the provision of infrastructure, and the technologies deployed with them, are invested with, and productive of, social and political relations that do not serve as a neutral conduit for the provision of services.

The notion of infrastructures as being invested with and productive of new social imaginaries have been alluded to in Chapter Two and Chapter Three, exemplified in instances of experiments with alternative housing and solar power systems in informal settlements as a means of improving living conditions. What this chapter has thus far attempted to demonstrate is that the iShack as an infrastructure - and its disjunctive parts – are not invisible substrates, but highly visible and powerful human and non-human objects that ‘spin out’ relations, fostering new political “communities” and differentiated publics along the lines of access and membership to specific infrastructural forms. To explore the political projects encompassed and invested in the grid and solar power in Enkanini is to situate these infrastructures against the types of personhood that arise from residents and iShack affiliates.

The provision of the grid is centred on the idea of demand at the level of the region, and what it invests in when present, is beyond the mere provision of resources, but rather the very basis for statecraft, as argued by Boyer (2015:533):

The grid is an apparatus subtly inclined to encourage demand, to expand itself, to solicit further dependency on its powers, which then grow in response. The grid helps to groove political efficacy, subjectivity, and affiliation; it is not just a state instrument, in other words, a tool invented to accomplish a governmental agenda. Rather, the grid must be understood as the organization of enabling power that allows any invention of statecraft to occur in the first place.

What this understanding of the grid's power alludes to is that its very presence enables forms of statecraft to exist in the first place, and more importantly, it refers to particular subjectivities and affiliation that come with it. In relation the claims made to Zandile at the time when the vandalism of the iShack hub occurred, the absence of the grid and the introduction of solar power not only threatened the grid's expansion, but more importantly would come to restrict the state as a development actor itself. Residents, calls for the grid not only referred to electricity but also claims to deliver on its mandate of the delivery of other basic services to the poor. Such claims to a form of dependence on the state is considered by Ferguson (2013:231) as reasonable, especially in the post-apartheid moment, because dependence, he argues, gives one the ability to make claims to those we are attached to. In Enkanini, not being attached to the grid is understood as not being tied to the state, leading some residents to question which claims to development and basic services could be made. Such a situation causes unease, as Ferguson (2013:232) notes, "for the poor in South Africa it is not dependence but absence that is truly terrifying". So in the face of the fear of those who are abjected by the state, subjection to it can only appear as a step up (Ferguson, 2013:231).

In the context of South Africa, Bank (2011:242 cited in Dumbled 2013) has also come to argue that there remains “a desire for greater rather than less dependence on the state”.

So far the notion has been put forth that, with the provision of the iShack came the production of clients via the logic of the market, which supposedly would separate the project from any involvement in state or party politics by producing autonomous, detached and self-regulating individuals who would no longer be dependent on the state. What was not wholly clear from the outset was how this means of providing infrastructures would sit against normative claims to the state as a development actor. In comparison to residents’ claims of the grid as a declaration of dependence on the state, the iShack Project attempted to negate such dependence. As Berry claimed when I questioned him about the role of the iShack Project in relation to the state, “What the iShack project is doing is resisting the state; it’s showing that peoples’ lives can be improved without having to rely on the municipality or government to deliver services”.

Such a claim made toward resisting the state as a figure of dependence is rooted in the emancipatory liberal imagination. What is sought after in this instance is individual autonomy and independence and this is closely associated with perceptions of dignity and freedom (Ferguson, 2013:224). However, Ferguson draws on, and questions, Amartya Sen’s (1999) argument that “development is actually defined as an increase in individual freedom, which in turn renders dependence and bondage, the very opposite of developmental progress” (Sen, 1999 cited in Ferguson, 2013:225).

In line with Sen’s iteration of development and progress as creating outcomes of freedom and autonomy, Scherz (2014:5) notes the particular orientation of development in the contemporary moment - as a logic of care - towards time, hierarchy, motivations of aid, the figure of the recipient and human agency. Development in this framing entails a future-orientated teleological narrative that sets up humanity as moving toward a common future in

modernity; a process that in its most ideal form seeks to eliminate hierarchy, while seeking to remake the world and its subject through planned intervention (Scherz, 2014:6-6).

With a logic centred on being an ‘apolitical’ development initiative, the greatest threat to the future of iShack Project could be found not in its attempts to remake the world Enkanini residents inhabited, or their attempts at producing an alternative energy future detached from the grids. Rather, by idealising independence and striving toward being an ‘apolitical’ mechanism for the delivery of services, the project, maybe without enough acknowledgement of the consequences – further weakened the hierarchical relationship residents sought from the state. The moment some residents felt that the iShack was hindering this relationship of dependence on the state, the iShack Project became entangled in the politics of service delivery and recognition in Enkanini. As Ferguson (2013:231) notes, recent ethnographies concerning local politics in South Africa, “have come to show that liberal emancipatory models of mobilization are often less successful than non-liberal ways of binding people together via hierarchical dependencies” (Ferguson, 2013:231). In Enkanini the case seems to be no different.

4.6 Conclusion

Having outlined the role of infrastructure as a tool of apartheid and its ensuing role in the demarcation and control over bodies gave rise to questions of what role infrastructures came to play after apartheid. The fall of apartheid and the ensuing project of constructing a liberal democracy required the transformation of the relationship between society and the state – including the endeavour tied to ‘making citizens’ (von Schnitzler, 2016:23) In the post-apartheid moment citizens were once again to be made and that this process of becoming factored in the provision of infrastructures and its political aspiration. So rather than dividing

the population, in the post-apartheid moment, infrastructures would be the basis for liberation from the harsh material realities of poverty in South Africa.

In Enkanini the unfolding process of experimentation with solar power as a viable development alternative had, over the course of the research, revealed that the iShack was initially conceived of as an ‘apolitical’ intervention that sought to deliver affordable low cost energy detached from the making of citizens or any political affiliations. However, this apolitical framing ignored the political potencies embedded in logics of development and service delivery Enkanini. Although there was some disjuncture between acknowledging the iShack as a mechanism for the electricity or to continue longing for the state, the tensions that arose in Enkanini is in part due to the distinction that was made between liberal thought and its adherence to being recognised as a self-regulating and autonomous individual and residents will to remained tied to the state as development actor.

What this chapter brings to light is that the relations between actors – including financial innovation, state policy, iShack notions of ‘apolitical’ service delivery, and residents understanding of their relation to the state - and their efforts to bring about alternative and innovative infrastructures and new social imaginaries wherein life come to reside are complicated not only by the technologies employed whether solar or grid infrastructures, but by the very logics through which they are brought into existence. The modes of the provision of a better life and their successful adoption are thus never the outcomes of a singular prevailing logic, but the amalgamation of techno-science, economics, and politics. The relationship between the state and the iShack Project - via the FBE grant - and the market driven approach to the delivery of electricity via solar confounds the relationship between residents, the project and the state.

What this leaves open are new found ways in which to question the presence of the state, resident's expectations of the infrastructures they are provided with and the limits at which the materiality of citizenship can come to be defined and redefined in the post-apartheid moment.

Since the demonstration the iShack had been working from outside the settlement, not installing new systems while only attending to maintenance and repair of existing clients systems. They were to use this time to reflect on what they have learned from the process far. A period of reflection on the challenges that faced the future stability of the project; technological failures, payment defaults, local unrest and employee strikes all part of the on-going challenge of transition experiments in a complex socio-political landscape were due. It was at that point in time that I too came to reflect on my time spent in the field, marking the end of my fieldwork in the informal settlement of Enkanini.

Chapter Five – Conclusion

5.1 Development Hope and Development Hype

This thesis has sought to bring to the fore the complex relations involved in attempts at providing the settlement of Enkanini with electricity via solar power infrastructure. From the outset of the research this thesis has resisted making any claims of the iShack Project as being the saving grace of the informal poor, or simply being second best solution to the normative standards of the grid. Doing so has made it possible to inquire about the finer nuances that are inscribed within the provision of solar power in the informal settlement of Enkanini.

Thus it has been shown how that the iShack Project and the narratives that uphold and destabilise its ability to create a low carbon energy institution operate at the level of the community, national government and even global energy and development politics. The narratives and discourses produced at these levels not only run through the iShack Project, but also become situated within those attached to the Project, either as an affiliate, client or onlooker, which then generates new forms of material being, belonging, citizenship and personhood.

By tracing the relations between the various actors – both human and non-human – encountered in the field, this thesis has attempted to argue that infrastructures such as the iShack Project are inherently unstable entities which requires work and attention that stretches beyond its material form and technical function. However, it has taken these uncertainties' to heart, in turn demonstrating how the iShack Project, as a fairly simple technological innovation and business model in the form of pay-for-service solar power, can come to open up bigger questions pertaining to concerns around the upgrading of informal settlements and future development trajectories, recognitions of the shift toward a low carbon future, and the creation and dissolution of (in)dependent beings.

What the research has taught me I now wish to pass on, not as a word of warning, but rather as sincere advice. I urge those moving through similar spaces to suspend normative claims of what counts as the success and failures of such innovations and work through the myriad of frictions and resistances that could at any given moment produce affects beyond the binaries of working or broken, innovation or conventional, hope or hype. It is exactly these points of friction and resistance surrounding experiments and innovation with infrastructures that become points of articulation for greater insight into the worlds we are attempting to build in future. Taking this as the first word, what an anthropology of infrastructure can most powerfully contribute, not only the discipline itself, but also the communities and societies in which we live, is some coherence to the messy and contested worlds in which we reside and the futures that are rising up around us.

5.2 Considerations for Future Research

What this thesis has attempted to unveil is a specific form of intervening in the material realities of those living in slums such as Enkanini. Apart from the technical aspirations of providing electricity via solar power what lies beyond such attempts are broader question of belonging – of what it means to be a citizen in relation to the state. The key idea here is that in the post-apartheid moment the state is not the sole provider of services even though it is still considered to be so by some of my interlocutors. Rather the state becomes entangled in complex socio-technical relations that redefine citizenship in technical as well as market terms. Further research regarding these relations would be useful for exploring how to adequately address the changing nature of infrastructural reforms and interventions that strengthen rather the divide opinions for the changing nature of the provision of infrastructures to those who do not enjoy access to traditional avenues for the delivery of basic infrastructures and services.

References

- Anand, A. (2016). Accretion — Cultural Anthropology. [online] Culanth.org. Available at: <https://culanth.org/fieldsights/715-accretion> [Accessed 7 Oct. 2016].
- Adam, (2010). Free Basic Electricity: A better life for all. 1st ed. [ebook] Johannesburg, p.14. Available at: <http://earthlife.org.za/www/wpcontent/uploads/2010/3/Free-Basic-Electricity-Final-Low-res.pdf> [Accessed 29 Oct. 2016].
- Ahmad, E. and Brosio, G. (2006). Handbook of fiscal federalism. Northampton, MA: Edward Elgar, p.202.
- Anand, N. (2016). Accretion — Cultural Anthropology. [online] Culanth.org. Available at: <https://culanth.org/fieldsights/715-accretion> [Accessed 1 Nov. 2016].
- Anon, (2016). [online] Available at: http://www.un-energy.org/cluster/energy_access 13/07/2016). [Accessed 7 Apr. 2016].
- Anon, (2016). The Constitution of South Africa. [online] Available at: <http://www.gov.za/sites/www.gov.za/files/images/a108-96.pdf> [Accessed 25 Oct. 2016].
- Barauh, B. (2016) NGO's as intermediaries for pro-poor urban electrification. In: M. Davids and S. Marvin, ed., *Retrofitting Cities: Priorities, Governance and Experimentation*, 1st ed. New York: Routledge, pp.151.
- Beatley, T. (2007). Envisioning Solar Cities: Urban Futures Powered By Sustainable Energy. *Journal of Urban Technology*, 14(2), pp.31-46.
- Beihl, J. and McKay, R. 2012. Ethnography as political critique. *Anthropological Quarterly* 84 (4), pp.1–14.
- Biehl, J., Good, B. and Arthur Kleinman, eds. 2005. *Subjectivity: Ethnographic Investigations*. Berkeley: University of California Press.

- Bolnick, A. (2009). Informal Settlement Upgrading: Towards an Incremental People Centred Approach. [online] Available at: http://sasdialliance.org.za/wp-content/uploads/docs/academic/2010_A.%20Bolnick_Informal_Settlement_Upgrading.pdf [Accessed 6 Apr. 2015].
- Boyer, D. (2015). Anthropology Electric. *Cultural Anthropology.*, 30(4), pp.531-539.
- Bulkeley, H., Castán Broto, V., Hodson, M. and Marvin, S. (2016). Cities and the Low Carbon Transition | The European Financial Review | Empowering communications globally. [online] [Europeanfinancialreview.com](http://www.europeanfinancialreview.com). Available at: <http://www.europeanfinancialreview.com/?p=2667> [Accessed 12 Jul. 2016].
- Callon, M. 1987. Society in the making: The study of technology as a tool for sociological analysis. In *The social construction of technological systems: New directions in the sociology and history of technology*, Ed. Wiebe E. Bijker et al. pp. 83–103. Cambridge: MIT Press.
- Cash, D., Clark, W., Alcock, F., Dickson, N., Eckley, N., Guston, D., Jager, J. and Mitchell, R. (2003). *Knowledge systems for sustainable development*
- Certeau, M. and Rendall, S. (1984). *The practice of everyday life*. Berkeley: University of California Press, p.xi.
- Chatterjee, P., 2004. *Politics of the Governed: Reflections on Popular Politics in Most of the World*. New York. Columbia University Press.
- Chenwi, L. (2016). Unpacking “progressive realisation”, its relation to resources, minimum core and reasonableness, and some methodological considerations for assessing compliance*. 1st ed. [ebook] Available at: <http://www.saflii.org/za/journals/DEJURE/2013/39.pdf> [Accessed 28 Oct. 2016].
- Davis, M. (2010). Planets of Slums: Urban Involution and the Informal Proletariat. *New Left Review*, 1(26), pp.5-34.

Delamont, S. and Atkinson, P. (2011). SAGE qualitative research methods. London: SAGE, pp.12-16.

Department of Housing (DoH). 2004. Breaking New Ground: A Comprehensive Plan for the Development of Sustainable Human Settlements. Pretoria: Department of Housing.

Dlamini, J. (2011). Voortrekker: the smoke that calls. p.33.

Dubbeld, B. (2013). Envisioning Governance: Expectations and estrangements of transformed rule in Glendale, South Africa. *Africa*, 83(03), pp.492-512.

Evans, J, Karvonen, A, Bulkeley, H (ed.), Castán Broto, V (ed.), Hodson, M (ed.) & Marvin, S (ed.) 2011, Living laboratories for sustainability: exploring the politics and epistemology of urban adaptation. in *Cities and Low Carbon Transitions*. Routledge, London.

Facebook.com. (2016). The iShack Project - Photos | Facebook. [online] Available at: https://www.facebook.com/iShackproject.org/photos/?tab=album&album_id=933891726649306 [Accessed 1 Nov. 2016].

Ferguson, J. (2013). Declarations of dependence: labour, personhood, and welfare in southern Africa. *Journal of the Royal Anthropological Institute*, 19(2), pp.223-242.

Ferguson, J., 2006. *Global Shadows: Africa in the Neoliberal World Order*. Durham: Duke University Press.

Geertz, C. (2016). Clifford Geertz's "Thick Description" explained (summary). [online] [Culturalstudiesnow.blogspot.co.za](http://culturalstudiesnow.blogspot.co.za). Available at: <http://culturalstudiesnow.blogspot.co.za/2012/05/clifford-geertzs-thick-description.html> [Accessed 30 Oct. 2016].

Giddens, A. (1990). *The Consequences of Modernity*. Stanford, Calif.: Stanford University Press, pp.31-34.

- Graham, S. and Marvin, S. (2001). *Splintering urbanism*. London: Routledge.
- Gupta, A. (2015). An Anthropology of Electricity from the Global South. *Cultural Anthropology.*, 30(4), pp.555-568.
- Harvey, P. and Knox, H. (2016). *Roads: An Anthropology of Infrastructure and Roads*. Itacha and London: Cornell University Press, pp.1-52.
- Hodson, M. and Marvin, S. (2016). Introduction. In: M. Davids and S. Marvin, ed., *Retrofitting Cities: Priorities, Governance and Experimentation*, 1st ed. New York: Routledge, pp.1.
- Ingold, T. (2000). *The perception of the environment*. New York: Routledge.
- Jackson, J. S. (2014) Rethinking Repair Gillespie. In: T., Boczkowski, P. and Foot, K. ed., *Media Technologies: Essays on Communication, Materiality and Society*. 1st ed. Cambridge: MIT Press, p.222.
- Larkin, B. (2013). The Politics and Poetics of Infrastructure. *Annu. Rev. Anthropol.*, 42(1), pp.327-343.
- Latour, B., 2004. *Reassembling the Social: An introduction to actor-network theory*. New York: Oxford University Press.
- Law, J. & Lien, M.E. 2013. Slippery: Field notes in Ontology. *Social Studies of Science*, 43(3), pp.
- Lei, M. and Sorenson, K. H. 1996. *Making Technology Our Own?: Domesticating Technology Into Everyday Life*. Scandinavian University Press North America.
- Lemaire, X. (2011). Off-grid electrification with solar home systems: The experience of a fee-for-service concession in South Africa. *Energy for Sustainable Development*, 15(3), pp.277-283.

Lennan, A. (2007). Unmasking delivery: Revealing the politics. *Progress in Development Studies*, 7(1), pp.5-20.

Michael, M., 2000. *Reconnecting Culture, Technology and Nature: From Society to Heterogeneity*. London. Routledge 363-378.

Miller, D. (1998). *Material cultures*. London: UCL Press, p.8.

Miller, D. (2001). *Home possessions*. Oxford, UK: Berg.

Miller, D. (2009). *Anthropology and the individual*. Oxford: Berg, p.4.

Mitchell, T. 2002. *The Rule of Experts: Egypt, Techno-Politics, Modernity*. London. University of California Press.

Nevens, F., Frantzeskaki, N., Gorissen, L. and Loorbach, D. (2013). Urban Transition Labs: co-creating transformative action for sustainable cities. *Journal of Cleaner Production*, 50, pp.111-122.

Nixon, R. (2011). *Slow violence and the environmentalism of the poor*. Cambridge, Mass.: Harvard University Press, p.2.

Pfaffenberger, B. 1992. Social Anthropology of technology. *Annual Review of Anthropology*, 21, pp.491–516. Available at: <http://www.jstor.org/stable/2155997> .

[Accessed July 3, 2013]

Pieterse, E. (2014) “Pushing against the frontiers of urban studies in (South) Africa”, in Kalagas, A. (ed) *Slumlab: Made in Africa*. No 9. Zurich: ETH University.

Pieterse, E. (2014). *Epistemological Practices of Southern Urbanism*. In: ACC Academic Seminar. Cape Town, pp.1-23.

Pincetl, S. (2016). Retrofitting biogenic urban infrastructures. In: M. Davids and S. Marvin, ed., *Retrofitting Cities: Priorities, Governance and Experimentation*, 1st ed. New York: Routledge, pp.70-72.

Povinelli, E., 2011. *Economies of Abandonment: Social Belonging and Endurance in Late Liberalism*. Durham: Duke University Press.

Redfield, P. 2012. *Beyond the Bush Pump: Relocating Science and Technology for Social Anthropology*.

Reeves, M. (2016). Infrastructural Hope: Anticipating ‘Independent Roads’ and Territorial Integrity in Southern Kyrgyzstan. *Ethnos*, pp.1-27.

Robins, S. (2014). Slow Activism in Fast Times: Reflections on the Politics of Media Spectacles after Apartheid. *Journal of Southern African Studies*, 40(1), pp.91-110.

Robins, S. and Redfield, P. (2015). *Toilets for Africa: Humanitarian Design Meets Sanitation: Activism in Khayelitsha, Cape Town*.

Scherz, C. (2014). *Having people, having heart*. University of Chicago Press.

Singh, S. (2012). *New mega trends*. Houndmills, Basingstoke, Hampshire: Palgrave Macmillan.

Star, S. L. 1999. “The Ethnography of Infrastructure.” *American Behavioral Scientist* 43, no. 3: 377–91.

Star, S.L. 1999. Ethnography of Infrastructure. *American Behavioural Scientist*, 43(3), pp.377-391. Available at: <http://abs.sagepub.com/content/43/3/377> [Accessed June 19 2014]

Star, S.L. 2010. This is Not an Boundary Object: Reflections on the Origin of a Concept. *Science, Technology and Human Value*, 35 (5), pp. 601-617. Available at: <http://sth.sagepub.com/content/35/5/601> [Accessed June 13 2014]

Sustainabilityinstitute.net. (2016). iShack. [online] Available at:

<http://www.sustainabilityinstitute.net/programmes/ishack> [Accessed 16 Sep. 2016].

Swilling, M. (2014). The iShack Project as social innovation.

Swilling, M. et al. (2011). Rethinking Incremental Urbanism: co-production of incremental informal settlement upgrading strategies. [online] Available at:

<http://hdl.handle.net/10019.1/87829> [Accessed 9 May 2014].

The Department of Minerals and Energy, (2003). Electricity Basic Services Support Tarrif.

Pretoria: Government Gazette, p.14.

Tsing, A. (2005). Friction: An ethnograpjy of global connection. Princeton, N.JPrinceton

University Press, p.5.

Vannini, P. (2009). Material culture and technology in everyday life. New York: Peter Lang.