

**Illuminating Energy Poverty: A case study of the energy needs and challenges of low-income households in De Aar, a renewable energy hub in South Africa's Northern Cape Province**

by

Stephanie Paula Borchardt

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Supervisor: Professor Cherryl Walker

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## Declaration

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## Abstract

This dissertation aims to examine the energy needs and energy challenges facing low-income households in the small Karoo town of De Aar, in the Northern Cape in the context of a local municipality that is struggling to sustain their electricity distribution. This is then further explored in relation to the significant investment in renewable energy that is currently taking place around the town, as part of South Africa's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). This dissertation does so through a mixed method case study of household energy poverty and precarity in Kareeville, a low-income neighborhood of De Aar which is supplemented by research on the Emthanjeni Local Municipality regarding its socio-economic challenges and energy infrastructure issues as well as on the contribution that renewable energy companies are making to local economic development.

This research made use of a case study design which I have employed through a mixed methods approach involving semi-structured in-depth interviews, observation, social media, policy and document analysis and a survey with key informants, residents from Kareeville, local municipal officials, NGO personal, farmers and representatives from renewable energy companies in De Aar.

My primary research findings reveal that energy poverty is endemic in Kareeville residential area. Whilst households have access to electricity, the affordability of the resource remains outside of their grasp. Managing household energy consumption in poor households is therefore a constant source of stress. Households employ various strategies to secure not only electricity but other fuel types such as wood, paraffin, and gas to meet their most basic of needs. Tensions around daily energy challenges play out across gender and generational lines, with household members often pitted against each other in terms of their individual and collective energy needs and preferences. The burden of energy management in financially stressed households is often felt particularly heavily by older women who, because of their gender and age, are unlikely to be working outside the home and are responsible for cooking, cleaning, and childcare.

From this perspective renewable energy companies in the local municipality could make an important contribution to local development through securing the towns energy supply and providing affordable electricity to the communities. Their development programmes, while making some contribution, only benefit a select few on a short-term basis. The top-down approach from renewable energy companies towards community development appear as tick-box exercises and remain ineffective with regards to upliftment and empowerment of households. The lack of coordination of development projects and communication amongst the REIPPPP companies and the local municipality only deepens the mistrust between the two and could potentially lead to an explosive engagement.

In conclusion, this study raises issues related to policy implementations and impacts that are not playing out as intended. The study stresses the importance of a sustainable development of

renewable energy as part of South Africa's commitment to reducing carbon emissions but also as having the potential to uplift and impact local households in the 'host' towns of the REIPPPP.

Keywords: Karoo; Energy poverty; REIPPPP, Renewable Energy; Sustainable Development

## Opsomming

Die proefskrif bestudeer die energie behoeftes en -uitdagings wat lae inkomste huishoudings in die klein Karoodorpie, De Aar, in die Noord-Kaap in die gesig staar te ondersoek in die konteks van 'n plaaslike munisipaliteit wat sukkel om hul elektrisiteitsnetwerk en verspreiding vol te hou. Dit word dan verder ondersoek in verband met die aansienlike ontwikkeling in hernubare energie wat tans rondom die dorp plaasvind, as deel van Suid-Afrika se Hernubare Energie Onafhanklike Kragprodusente-verkrygingsprogram (REIPPPP). Die studie analiseer die karakter en omvang van energie-armoede in die huishoudings van Kareeville, 'n lae inkomste buurt in De Aar, deur van die die gemengde-metode gevallestudie ontwerp gebruik te maak. Aanvullend tot die studie is 'n ondersoek na die Emthanjeni Plaaslike Munisipaliteit se sosio-ekonomiese uitdagings en energieinfrastruktuurkewessies; sowel as die bydrae wat hernubare energie maatskappye tot plaaslike ontwikkeling lewer.

Die navorsingsmetodes sluit die volgende in: 'n verteenwoordigende studie van huishoudings in Kareeville, opvolgende in-diepte semi-gestruktureerde onderhoude met 'n steekproeftrekking van inwoners in Kareeville, in-diepte semi-gestruktureerde onderhoude met sleutelinformante (munisipale personeel, NGOs boere, en verteenwoordigers van hernubare energie maatskappye), in plek waarneming en sosiale media, en beleide en dokumentêre analise. Die konseptuël-eraamwerk sentreer op die begrip van volhoubare ontwikkeling; asook drie nie-onderhandelbare morele verpligtinge: (die bevrediging van menslike behoeftes, versekering van sosiale regverdigheid, en die respekteer van omgewingsbeperkings). Addisioneel sal ander konsepte gebruik word soos die van skaal (op watter vlakke en skaal beluite geneem word), die konsep van energie-armoede, geslag en die Minerale-Energie Kompleks (MEC).

Die hoof navorsingsbevindings van hierdie studie bevestig dat energie-armoede endemies in Kareeville is. Alhoewel huishoudings aan die elektrisiteitsnetwerk gekoppel is, kan baie min genoeg elektrisiteit vir hul maandelikse behoeftes, bekostig. Die bestuur van huishoudelike-energieverbruik is in arm huishoudings 'n konstante bron van spanning. Huishoudings maak van verskillende strategieë gebruik om te verseker dat hulle energie het. Huishoudings gebruik verskeie strategieë om nie net elektrisiteit te versker nie, maar ook ander brandstoftipes soos hout, paraffin en gas om in hul mees basiese behoeftes te voorsien. Spanning rondom daaglikse energie-uitdagings speel af oor geslag en generasielyne met huishoudelike lede wat dikwels teen mekaar staan in terme van hul individuele en kollektiewe energiebehoefte en -voorkeure. Die las van energiebestuur in huishoudings wat nie finansieël stabiel is nie, word dikwels veral swaar gevoel deur ouer vroue wat weens hul geslag en ouderdom waarskynlik nie buite die huis sal werk nie en verantwoordelik is vir kook, skoonmaak en kindersorg.

Vanuit hierdie perspektief kan hernubare energiemaatskappye in die plaaslike munisipaliteit 'n belangrike bydrae tot plaaslike ontwikkeling lewer deur die dorpe se energievoorsiening te verseker en bekostigbare elektrisiteit aan die gemeenskappe te verskaf. Hulle ontwikkelingsprogramme, terwyl hulle 'n mate van bydrae lewer, bevoordeel slegs 'n paar uitgesoekte op 'n korttermynbasis. Die bo-na-onder-benadering van hernubare energiemaatskappye tot gemeenskapsontwikkeling verskyn as regmerk-oefeninge en bly ondoeltreffend met betrekking tot opheffing en bemagtiging van huishoudings. Die gebrek aan koördinering van ontwikkelingsprojekte en kommunikasie tussen die REIPPPP-maatskappye en die plaaslike munisipaliteit verdiep net die wantroue tussen die twee en kan moontlik lei tot 'n plofbare verbintenis.

Ten slotte stel hierdie studie kwessies wat verband hou met nasionalebeleidsimplementerings wat nie 'n impak op die plaaslike vlak maak soos bedoel nie. Die studie beklemtoon die belangrikheid van 'n volhoubare ontwikkeling van hernubare energie as deel van Suid-Afrika se verbintenis tot die vermindering van koolstofvrystellings, maar ook dat dit die potensiaal het om plaaslike huishoudings in die 'gasheer' dorpe van die REIPPPP op te hef en te beïnvloed.

Sleutelwoorde: Karoo; Energie-armoede; REIPPPP; hernubare energie, Volhoubare ontwikkeling

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## List of Abbreviations and Acronyms

ANC	African National Congress
CEF	Central Energy Fund
CO <sub>2</sub>	Carbon dioxide
COD	Commercial Operations Date
COP	Conference of Parties
COVID-19	Coronavirus disease of 2019
CSG	Child Support Grant
CSP	Concentrated Solar Power
CWP	Community Works Programme
DALRRD	Department of Agriculture Land Reform and Rural Development
DEIC	Dutch East India Company
DMR	Department of Mineral Resources
DMRE	Department of Mineral Resources and Energy
DoE	Department of Energy
DoRA	Divisions of Revenue Act
DP	Disability Grant
DST	Department of Science and Technology
EBSST	Electricity Basic Services Support Tariff
ECB	Electricity Control Board
ED	Enterprise Development
EEDM	Energy Efficiency and Demand Management Grant
EPWP	Expanded Public Works Programme
ESKOM/ ESCOMV	Electricity Supply Commission

FARR	Foundation for Alcohol Related Research
FBAE	Free Basic Alternative Energy Policy
FBE	Free Basic Electricity
FIT	Feed-in tariff
GDP	Gross Domestic Product
GEAR	Growth, Employment, and Redistribution
GHG	Greenhouse Gas
IBT	Incline Block Tariff
IDP	Integrated Development Plan
IEP	Integrated Energy Plan
INDC	Intended Nationally Determined Contributions
INDC	Intended Nationally Determined Contributions
INEP	Integrated National Electrification Programme
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent power producer
IPPO	Independent Power Producer Office
IPPPP	Independent Power Producer Procurement Programme
IRP	Integrated Resource Plan
IUCN	International Union for the Conservation of Nature
KRSDF	Karoo Regional Spatial Development Framework
kW/ /kWh	Kilowatt/ kilowatt-hour, equal to 1,000 watts of electrical power
LED	Local Economic Development
MEC	Minerals-Energy Complex
MIG	Municipal Infrastructure Grant
MW/MWh	Megawatt/megawatt-hour

NDP	National Development Plan
NERSA	The National Energy Regulator of South Africa
NGO	Non-Governmental Organisation
NUMSA	National Union of Metalworkers of South Africa
OPG	Old Persons Grant (Pensioners grant)
PAYG	Pay-As-You-Go
PPA	Power Purchase Agreement
PPE	Personal Protective Equipment
PV	Photovoltaic
RDP	Redistribution and Development Programme
RE	Renewable Energy
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
SALGA	South African Local Government Association
SAR	South African Railway
SASSA	South African Social Security Agency
SDGs	Sustainable Development Goals
SED	Social Economic Development
SIPs	Strategic Integrated Projects
SKA	Square Kilometre Array
SMMEs	Small, Medium and Micro Enterprises
SPSS	Statistical Package for the Social Sciences
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
VFP	Victoria Falls Power Company
WADA	Wind Atlas for South Africa

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WCED	World Commission on Environment and Development
WSIG	Water Services Infrastructure Grant
WWF	World Wildlife Fund

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## Chapter One: Introduction

This dissertation examines the energy needs and challenges facing poor households in the small town of De Aar, a renewable energy hub in South Africa's Northern Cape Province where the local municipality is struggling to manage electricity distribution. It does so through a case study of household energy poverty in Kareeville, a low-income suburb of De Aar, supplemented by research on the local municipality regarding its socio-economic challenges and energy infrastructure issues as well as on the contribution that renewable energy companies are making to local economic development. This set of issues is examined in relation to the significant national and international investment in renewable energy that is currently taking place around the town, as part of South Africa's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).

While renewable energy is widely recognised as critical for turning South Africa away from its reliance on coal and reducing its national and global carbon footprint (Menyah & Wolde-Rufael, 2010; Sebitosi, 2008; Pretorius, Piketh, Burger & Neomagus, 2015), it is not clear whether or to what extent local communities are benefitting from the current roll-out of large renewable energy plants in their backyard, whether in the form of cheaper and cleaner sources of household energy or improved access to jobs and other social and economic opportunities. Under the current regulatory dispensation, renewable energy companies sell the electricity they generate to Eskom, South Africa's national power utility, not directly to the nearest municipal substation or to households in their 'host' communities. Furthermore, their investment in local economic development programmes is not necessarily aligned with the priorities of local households or aimed at addressing the challenges facing local municipalities (Wlokas, 2015; McDaid, 2016; Kiragu, Adeleke & Murombo, 2016; Morar, 2019; Nzo, 2021; Malope, 2022).

My research is informed by the work of Holden, Linnerud, and Banister (2016) and Holden, Banister, Linnerud, Schwanitz, & Wierling (2018) on sustainable development, in particular their interpretation of the concept as based on the interaction of three 'moral imperatives', namely, the satisfaction of human needs, the promotion of social equity and respect for environmental limits. In their analysis these three moral imperatives are all equally important and must be addressed in tandem. A multi-faceted renewable energy programme that includes tackling energy poverty within its design, and indirectly poverty

more generally, can be seen to address all three moral imperatives. Holden et al.'s model raises larger questions about the understanding of 'sustainable development' informing South Africa's current renewable energy programme, and the extent to which investment in the renewable energy sector nationally is making a significant contribution to this endeavour at the local level.

I first became interested in renewable energy after visiting a wind farm in Loeriesfontein during a field trip in February 2017. What was striking was the gap between the extent of the temporary employment generated locally during the construction phase compared to what the jobs position would become after the wind farm had reached its Commercial Operations date (COD), when just a small number of technicians would take over the management of the project. What further sparked my interest in the renewable energy sector was a further field trip to De Aar later that year. In Loeriesfontein the wind farms are located some 50 kilometres from the town centre, so the wind turbines are not visible to residents, but in De Aar the solar and wind farms are visible from the town. The solar farms in particular are close to the low-income neighbourhoods located on the eastern side of the town. Upon further reading, I found very little research had been undertaken on the REIPPP programme and the benefits of renewable energy for South Africans beyond job creation. The technology of renewable energy brings what seems to be an obvious benefit to the world in terms of reducing carbon emissions and providing cleaner sources of energy; however, I found myself questioning the extent of the benefits that renewable energy promises if impoverished households cannot afford the product, electricity.

De Aar is currently the site for six renewable energy 'Independent Power Producer' (IPP) projects (four solar farms and two wind farms) which together generate a total of 483 megawatts (MW) that are fed into the national electricity grid. Three of the solar farms – Mulilo Renewable Energy Solar PV De Aar; Solar Capital De Aar (Pty) Ltd; Solar Capital De Aar 3 – were approved as IPPs during the first bid window of the REIPPPP in 2012. De Aar Solar Power was signed during the second bid window in 2013, and the two wind farms, Longyuan Mulilo De Aar 2 North Wind Energy and Longyuan Mulilo De Aar Maanhaarberg Wind Energy Facility, were signed up as IPPs during the third bid window, in 2014. Alongside this investment in renewable energy for the national grid, the 2016-2021 Integrated Development Plan (IDP) of the Emthanjeni Local Municipality (in which De Aar is located) stated that while almost all households in De Aar have basic electrification, the municipality's energy infrastructure is suffering from a maintenance



backlog (because of the lack of local expertise and funds) which threatens the town's energy supply (2016:80).

This disjuncture made me wonder how the people living close to the new solar and wind farms feel about the renewable energy projects in their backyard. Further background research led me to the concept of energy poverty and the reality that many households in South Africa cannot afford electricity, although they have formal access to it, inasmuch as their houses are connected to the national electricity grid. This raised further questions about whether and how the rollout of renewable energy projects could be harnessed to address household energy poverty in the municipalities in which they are being constructed. This in turn required a deeper understanding of the nature of household energy poverty and electricity supply in towns such as De Aar, with its high levels of poverty, that are hosting renewable energy projects.

Accordingly, this dissertation builds on research I began for an MA thesis in 2017.<sup>1</sup> It aims to deepen our understanding of household poverty in communities that are hosting renewable energy projects, by exploring the nature and extent of energy poverty that is endemic among poor households in De Aar. As part of this undertaking my study also delves into the challenges facing the Emthanjeni Local Municipality in managing both its electricity (and other) infrastructure and its relationship with the Independent Power Producers (IPPs) that are active in the municipality. In addition, my study looks at the local economic development contribution of the IPPs and relates the energy challenges in De Aar to current policy, political and academic debates on the national electricity crisis in South Africa.

In this introductory chapter I present my problem statement and research rationale in the next section. This is followed by sections in which I set out my primary and subsidiary research questions and provide a short introductory statement concerning my research design. Thereafter, in section 1.4, I provide brief contextual background on South Africa's energy policy, the REIPPP programme and De Aar, my research site. Finally, section 1.5 provides an overview of the nine chapters making up the dissertation.

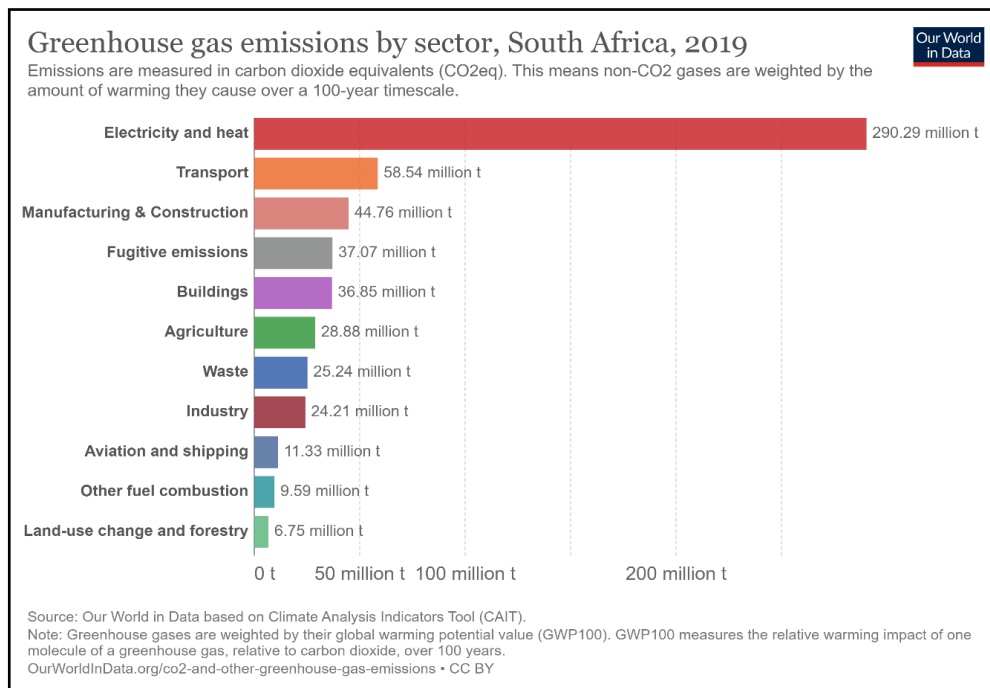
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<sup>1</sup> In 2019 I applied to upgrade my study into a PhD project which was approved in 2020.

## 1.1 Problem statement and rationale

The energy sector in South Africa encompasses a complex and contested field. In 2011 the Carbon Dioxide Information Analysis Center in Washington noted South Africa's status as the largest emitter of greenhouse gasses in Africa and one of the most carbon-emission-intensive countries in the world (Boden, Marland & Andres, 2011). This is due to the country's high dependence on coal-powered electricity generation and the mining and export of coal as a commodity (Department of Minerals and Energy, 2003:3; Boden et al., 2011). In 2016 the Emissions Database for Global Atmospheric Research (European Commission, 2016) stated that South Africa's carbon dioxide (CO<sub>2</sub>) emissions had increased drastically after 2000, reaching a peak between 2008 and 2010 when it was emitting 433,086.32 Kilotons of CO<sub>2</sub> per annum. This peak has since been superseded – according to research published on 'Our World in Data' (Ritchie, Roser & Rosado, 2020) as of 2020 South Africa's annual CO<sub>2</sub> emissions totalled 451, 95 million Kilotons. As can be seen in Figure 1.1 below, in 2019 the electricity sector was responsible for the most greenhouse gas emissions in the country by far.

Figure 1.1: Greenhouse gas emissions by sector in South Africa, 2019



Source: Ritchie, Roser & Rosado (2020), Our World in Data

The South African government has committed to reducing its carbon footprint by shifting away from carbon-intensive energy production. In 1998, when its *White Paper on Energy Policy* was published, climate change was not a pronounced concern nationally while globally this issue was rarely spoken of outside scientific circles (where it was of mounting concern). The government's commitment to renewable energy was first introduced in its 2003 *White Paper on Renewable Energy*. In 2011, the then Department of Energy (DoE), along with the National Treasury (NT) and the Development Bank of Southern Africa (DBSA), established the Independent Power Producer Office (IPPO), with the mandate to secure energy supply for the country (IPPO, 2017:6). By the 2019 revision of the Integrated Resource Plan (IRP), the Department of Minerals and Energy (2019) had identified renewable energy as an important component of the country's 'energy mix' but the transition to renewables was being met with resistance which predated the release of the IRP. This is because coal remains one of South Africa's major exports while labour unions such as the National Union of Metalworkers of South Africa (NUMSA) and the National Union of Mineworkers (NUM) have argued that the decommissioning of coal-fired power plants will result in major job losses, with severe impacts on communities in coal-mining areas in KwaZulu Natal and Mpumalanga (Satgar, 2015; Cock, 2018, 2019; Jim, 2018; Cloete, 2018; Malope, 2022).

Renewable energy is widely recognised as critical for turning South Africa away from its reliance on coal to drive the generation of electricity, thereby reducing its global carbon footprint while meeting the energy needs of the country (Sebitosi, 2008; Menyah & Wolde-Rufael, 2010; Pretorius, Piketh, Burger & Neomagus, 2015). At the same time, renewable energy has the potential to extend beyond supplying the national electricity grid and provide clean and affordable electricity for domestic consumption. Investment in renewable energy could not only advance the country's economy nationally but address local needs in non-metropolitan municipalities, including household energy poverty. This is, however, dependent on the design of an appropriate renewable energy programme and the implementation thereof.

While the primary mandate of the IPPO is to secure electricity from the private sector involving both renewable and non-renewable energy sources, energy policy is not restricted to technological developments but has also been harnessed to commitments to social development and economic growth. Already in 2003, the then Deputy Minister of Minerals and Energy, Susan Shabangu, pointed to the vital role renewable energy could play in addressing social issues in rural areas, by tackling challenges such as poverty and

high rates of Foetal Alcohol Spectrum Disorder (FASD) through investment and job creation (Department of Minerals and Energy, 2003). Of note here is that in 2015/16 De Aar, my study site, had the highest recorded prevalence rate of FASD in South Africa (Skosana & Koza, 2014; Isaacs, 2015; Kelly & Mian, 2016; Manoko, 2016). At the same time, the Emthanjeni Local Municipality (ELM) in which it falls is struggling to meet its responsibilities for electricity supply and management, as well as to establish effective partnerships with the national and international companies developing wind and solar plants in its area of jurisdiction. This raises larger questions around the understanding of 'sustainable development' informing South Africa's current renewable energy programme, and the extent to which investment in the sector nationally is contributing to sustainable development at the local level.

The extent to which local communities are benefitting from the rollout of large renewable energy plants in their backyards is questionable. Much of the focus on a 'just transition' (Swilling & Annecke, 2012; Baker, Newell, & Phillips, 2014; Mqadi, Musango, and Brent, 2018) has been on the position of coal miners if the economy pivots from coal to renewable energy as its main source of electricity; very little attention has been directed at the concerns of communities in the sites where renewable energy projects are being built.

Extensive research has been done regarding the structure of South Africa's energy sector, electricity non-payment struggles in metropolitan areas (most notably protests in Soweto) and the environmental benefits and limitations of renewable energy (Bond, 2002, 2012; Baker, 2015a, 2015b, 2016; Baker & Wlokas, 2015; Büscher, 2009; Cohan, 2015; Eberhard, 2016; Eberhard, Kolker & Leighland, 2014; Essex & de Groot, 2019; Krupa & Bursch, 2011; Inglesi, 2010; Sebitosi, 2008; Swilling, 2012; Upadhyaya, 2016; Winkler, 2009; Wu, Murphy-Meriscal & Hernandez, 2015; Davies, 2021; de Groot, Mohlakoana, Knox & Bressers, 2017). There is a body of literature on alternative renewable energy technologies at the household level in other parts of Africa (IRENA, 2017; Kazeem, 2019; Jaglin, 2019a; 2019b; Silverstein, 2019; IRENA, 2021); however, very little attention has been paid to opportunities for off-grid community owned electricity networks in South Africa (Chukwuma, Azimoh, Klintenberg, Wallin, Karlsson & Mbohwa, 2016).

Research has also been conducted on the energy needs and consumption patterns of 'shack'<sup>2</sup> and backyard dwellers as well as households in metropolitan townships and some rural communities (Eberhard 1986; Cousins, 1998; Annecke, 2000; Davidson, Winkler, Kenny, Prasad, Nkomo, Sparks, Howells & Alfstad, 2006; Ismail, 2015; Appies, 2016; Francioli, 2018; Sole & Wagner, 2018). However, relatively few sociological studies have been done on local energy needs and challenges in the Northern Cape. Even fewer studies have related the energy needs of poor households in this province to the national investment in renewable energy, despite the province's importance as a renewable energy hub. Large renewable energy projects dominate the Northern Cape landscape, yet local municipalities cannot afford the maintenance of their electricity infrastructure, which affects local electricity distribution negatively (Nqaba, Pearson & Chilenga, 2017; Covary, 2020; Ledger, 2021; Nzo, 2021; Kemp, 2022). There also remains a critical gap in knowledge relating to energy usage and energy challenges in households that are connected to the national grid but are unable or only marginally able to purchase the electricity they need for daily domestic purposes (cooking, washing, lighting).

The Northern Cape is an arid to semi-arid region which accounts for 31% of South Africa's land surface but only 2,2% of its population. Despite its geographical size, the province is considered isolated and politically and economically marginalised in comparison to the rest of the country (Walker, Milton, O'Connor, Maguire & Dean, 2018; Walker 2019). Although extensive sheep farming has been a mainstay of the provincial economy for some 150 years, the potential of agriculture as a major employer is limited and the sector regularly comes under extreme pressure due to periodic droughts (Gillson, Hoffman, Carrick & West, 2009; Hohne, Esterhuyse, Fourie, Gericke, & Esterhuyse, 2020; Hogg, 2021; Meiring, 2021). At the same time, high radiation levels and wind in some regions make the province well-suited for large-scale renewable energy projects.

While the Northern Cape has been targeted as a major renewable energy hub, the articulation between local energy needs and constraints in this province and national development priorities thus remains poor. Local municipalities cannot afford the maintenance or upgrading of their electricity infrastructure, which affects their distribution (Atkinson, McIntosh, Smith & De Visser, 2002; Meyer, 2014; Hill & Nel, 2018; Fouché & Brent, 2019; Nzo, 2021). Energy poverty remains a challenge in many Karoo households,

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<sup>2</sup> Informal housing

with energy access and affordability stratified along racial and class lines (Ngarava, Zhou, Ningi, Chari & Mdiya, 2022; Phillips & Petrova, 2021; Mhlanga & Garidzirai, 2020). Again, however, there is a gap in knowledge relating to the energy challenges of small-town Karoo households that are connected to the national grid but cannot afford electricity on a continuous basis. Mere connectivity to electricity through having a prepaid electricity metre installed does not equate to a household being able to rely on electricity as a source of energy to meet its daily needs.

The challenges facing especially poor households in the local municipalities where renewable energy projects have been developed are under-researched. Addressing these gaps and interrogating the contribution of the renewable energy sector to sustainable development at the household level are among the important contributions to knowledge my study makes.

## **1.2 Research Questions**

My underlying concern is with the potential of South Africa's renewable energy sector to contribute to sustainable development in poor, marginalised communities that are formally connected to the national electricity grid, through the provision of affordable, environmentally sustainable electricity for household use in the first instance, as well as to local economic development more generally. Using De Aar as a case study, my dissertation addresses two main research questions:

- 1) What are the energy needs and challenges facing poor households in communities hosting renewable energy projects, and
- 2) What contribution is the renewable energy sector making to local energy provision and social-economic development? Put differently, given the claims of the renewable energy sector to provide clean energy, to what extent are poor households benefitting from their projects?

The following subsidiary research questions have guided my investigation of this cross-cutting set of issues in my research site:

- What strategies are poor households in De Aar adopting to meet their energy needs?
- What is the role of the local municipality in securing local energy sustainability and what challenges are they facing in this regard?
- What contribution is the renewable energy sector making to local municipal energy sustainability and what is the contribution to sustainable development through their enterprise development and socio-economic development programmes?
- How is South Africa's commitment to the rollout of renewable energy at a national level impacting on and playing out in my study site?

### **1.3 Research design**

To answer my research questions, I have developed a mixed-methods, case-study research design that combines both quantitative and qualitative data collection methods. A mixed-methods research design has allowed me to produce both quantified data on household composition, income, energy needs, and consumption patterns within my study site, and qualitative data on the views and experiences of residents regarding their development priorities and energy needs. My qualitative research methodology extended beyond local households to incorporate the perspectives of national energy experts and policymakers as well as informants in the local municipality and the renewable energy companies and non-governmental organisations (NGOs) operating in my study site. As discussed further in the next chapter, additional methods included observation, including via social media, and documentary and policy analysis.

Within De Aar I identified Kareeville, a formal, low-income township, as my case study site. Kareeville is inhabited by people historically classified by the state as 'coloured' under apartheid. While I do not claim that this township is fully representative of all poor areas in De Aar, it exemplifies many of the issues that I am examining in terms of household energy

needs and affordability. The criteria I used in making this selection are spelled out in Chapter Two.

In developing my conceptual framework (discussed in Chapter Three), I have drawn on two main bodies of literature: 1) critical engagements with the concept of sustainable development and 2) the literature on energy poverty, including in South Africa. Additional concepts that have proved useful are those of scale, in relation to the conceptualisation of both sustainable development and the energy dispensation in South Africa, as well as that of the minerals-energy complex within South Africa and the unsustainable development pathway for the country that that has underpinned.

With regards to my conceptualisation of sustainable development, I am, as already noted, drawing on the work of Holden, Banister, Linnerud and their co-authors (Holden & Linnerud, 2007; Holden et al., 2013, 2016; Holden, Banister, Linnerud, Schwanitz & Wierling, 2018), while also paying attention to general critiques of the concept (Lafferty, 1999; Lafferty & Langhelle, 1999; Lafferty, 2004; Redclift, 2005). Holden and his co-authors have reworked the classic definition of sustainable development that the World Commission on Environment and Development (WCED) developed in 1987, which defined it as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (WCED,1987:41). They argue that to be truly sustainable, development initiatives must be based on what they describe as three non-negotiable, moral imperatives: satisfying human needs, ensuring social equity and respecting 'planetary' (i.e., ecological) limits (2016:2). Their three moral imperatives are all equally important and cannot be addressed in isolation from each other. They also acknowledge that human needs are culturally shaped and endorse the capabilities approach to human development as conceptualised by Amartya Sen (1987a, 1987b, 1993, 1999).

Their conceptualisation thus de-emphasises economic development and highlights the importance of meeting human needs, linked to social justice, while respecting and working within environmental limits. The reordering of economic growth into meeting the basic needs of people is a useful as a debate on energy poverty and a just transition in the country. In the context of debates on the place of renewable energy in South Africa's energy mix, this means that while the state should be taking urgent steps to reduce the consumption of fossil fuels, energy policy also needs to be aimed at enhancing human



capabilities and ensuring wider public participation in and benefits from the policymaking in this regard.

Scale has emerged as a key variable in analyses of the current rush of development initiatives within the Karoo, which include investments in astronomy and potential shale-gas mining and uranium mining, in addition to renewable energy (Atkinson, 2019; Walker, 2019; Walker, Chinigò & Dubow, 2019). Currently, there is a disjuncture between national policy statements on the benefits of these developments and their articulation with development needs and priorities locally (Kirshner, Baker, Smith & Bulkeley, 2019). Renewable energy is seen as critical for the health of the global environment and as a 'green' energy solution for South Africa nationally, yet poor households at the local level are not seeing their energy needs met; they are demanding energy affordability, regardless of whether the energy is renewable or not. My research also shows that residents in De Aar townships have very little knowledge of what climate change and renewable energy mean; their primary concerns are related to poverty, unemployment, substance abuse, and housing while they battle to afford the electricity that the municipality supplies. The scalability of sustainable development in relation to energy supply is therefore something that I unpack further, drawing, *inter alia*, on Delaney (1997), Delaney & Leitner (1997); Gibson, Ostrom & Ahn (2000); Marston (2000); Perey (2014); Bouzarovski & Simcock (2017). I have extended scale to the household level which will be unpacked in Chapter Three.

I also engage with the sociological literature on energy poverty and energy consumption in poor households. Energy poverty is not the absence of an electricity connection but, rather, refers to the inability to secure the energy resources a person, or, in this instance, a household needs to sustain human wellbeing and service basic needs. Energy poverty also encompasses the stress and burden of time management involved in trying to meet household energy needs with very limited funds and/or insufficient access to natural resources. Here I have paid particular attention to gender dynamics, given that women are, typically, the managers of household energy supply and consumption who have primary responsibility for stretching limited resources as far as possible (Abrahams & Mohlakoana, 2010; Annecke, 2000, 2008; Annecke, Spalding-Fecher, Williams & van Horen, 2000; Mohlakoana, 2014; Sole 2015; Phillips & Petrova, 2021). Generational tensions pertaining to domestic energy usage have received less investigation in comparison to the gendered dimensions but also emerged as an issue through my fieldwork. This will be further discussed in Chapter Seven.

Finally, I have drawn on Fine and Rustomjee's (1996) concept of the minerals-energy complex (MEC) as an important point of departure for understanding the political economy of South Africa, including the way the national electricity dispensation was set up historically (which excluded the majority of South Africans from its benefits) and current debates on energy policy. Fine and Rustomjee (1996) not only traced the history of the relationship between the mining and energy sectors in South Africa but also provided a conceptual framework for understanding the processes of capital accumulation that this has facilitated and the unsustainable development trajectory on which it set the country. (See also Baker et al, 2014; Freund, 2010; McDonald, 2008, 2011; Sharife & Bond, 2011; Swilling & Annecke, 2012). In this regard, De Aar is particularly interesting as a research site because of its history as a large railway junction that was established during the Kimberley diamond rush in the late nineteenth century.

## 1.4 Background

### 1.4.1 Electricity access in South Africa.

In 1994, the year of South Africa's transition to democracy, Eskom, South Africa's national energy parastatal, claimed that in 1988 it had had the fifth largest generation capacity in the western world.<sup>3</sup> It also acknowledged that at that time a mere 44% of South African households had access to electricity, most of them white and living in urban areas (Eskom, 1994:19). This can be attributed to the inequities and policy implementations of colonialism and apartheid and the way in which state investment in electricity capacity in the twentieth century developed in support of mining capital, discussed further in Chapter Three. After the democratisation of South Africa in 1994, the government identified energy as a primary object for transformation, along with various other sectors. A key objective was to increase access to electricity and address the affordability of energy services for all households, in both urban and rural areas in South Africa. These objectives were captured in the Department of Minerals & Energy's 1998 *White Paper on Energy Policy*.

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<sup>3</sup> in terms of installed capacity compared to Europe, North America, South America and Australia.

Eskom's ensuing electrification rollout programme was a success measured in terms of households connected to the national grid. Basic access to electricity increased from 31% in 1991 to 88% as of March 2016 (South African Government, 2022). In the Northern Cape, the Integrated National Electrification Programme (INEP) connected 136 280 houses between 1994 and 2014 (Department of Energy, 2014). However, mere access to the national grid soon became a point of contestation. In April 2003, the government also adopted a 'Basic Electricity Support Tariff' policy. This policy made provision for 'free-basic electricity' (FBE) to all households that met their local municipality's criteria for indigency. Households deemed to be 'indigent' were eligible for free basic services. In 2003 the Department of Energy decided that qualifying households would be entitled to 50 kilowatt-hours (kWh) per month (or a 30-day cycle) for free, after which they would have to purchase electricity at the standard rate (Department of Minerals and Energy, 2003). In 2021 the Emthanjeni Local Municipality (2021c:3) defined households as indigent if the total household income is less than R4 750 per month regardless of households' size.<sup>4</sup>

However, as many studies have shown, mere connectivity to the grid does not equate with actual access in terms of affordability while many households have been disconnected in the past due to non-payment of their municipality service charges. This has caused major protests and boycotts of electricity payments in major areas (Mufson, 2013; Potelwa, 2014; Banda, 2021; Maliba, 2022). Furthermore, instability in the country's electricity sector in recent years has seen a sharp increase in energy tariffs which has added to the financial pressures on especially poor households.

#### 1.4.2 Research site: Kareeville Extension 10, De Aar

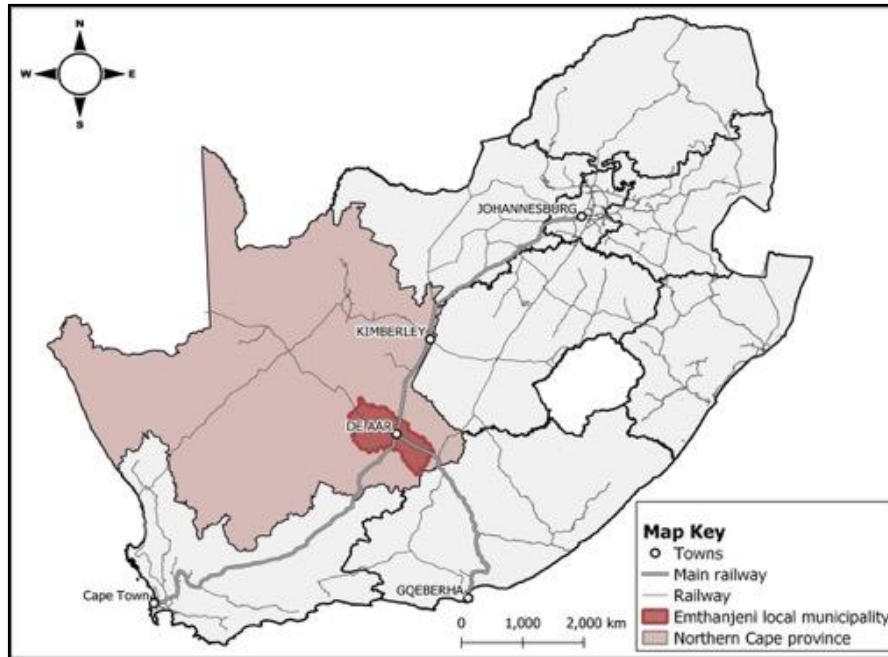
Figure 1.2 shows the location of the town of De Aar in the Emthanjeni Local Municipality in the Northern Cape Province. The town plays an important administrative role in the province as it is the head office of not only the local municipality but also the larger Pixley Ka Seme District Municipality. It thus hosts all government departments serving the wider district. The local municipality includes two other towns: Britstown, which lies 50 kilometres to the west, and Hanover which lies 65 kilometres to the east of De Aar. De Aar is the

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<sup>4</sup> The ELM has adjusted this to R4950 per month, however this has not been accepted yet (ELM, Facebook, 2022)

largest of the three towns with a total population of 23 760 people in 2011, the year of the last published national census (Statistics South Africa, 2011a).

Figure 1.2: Location of De Aar and the Emthanjeni Local Municipality within the Northern Cape Province of South Africa



Source: SARCHi Research Chair in the Sociology of Land, Environment and Sustainable Development, 2021<sup>5</sup>

As already noted, De Aar is particularly interesting as a case study site because of its history as a railway junction and the role transport played in South Africa's mining revolution. As already noted, Fine and Rustomjee (1996) have argued that South Africa's economic growth in the twentieth century was largely shaped by a 'minerals-energy complex' (MEC) in which state investment in infrastructure, including in the energy and transport sectors, played a crucial role in the swift development and industrialisation of certain areas of the country while other areas were left neglected (Freund, 2010; Sharife & Bond, 2011). However, in the 1990s, state investment in rail transport declined and the rail sector was hit with massive job losses. De Aar's unemployment rose as the railway sector declined. In 2012 Lian-Marie Drotsky, coordinator for the Foundation for Alcohol Related Research (FARR) in De Aar, noted that levels of unemployment were high in the

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<sup>5</sup> This PhD has been undertaken within this Research Chair which is located at Stellenbosch University in the Department of Sociology and Social Anthropology.

town and “joblessness and poverty have created a general feeling of hopelessness in the community” (quoted in Stassen, 2012).

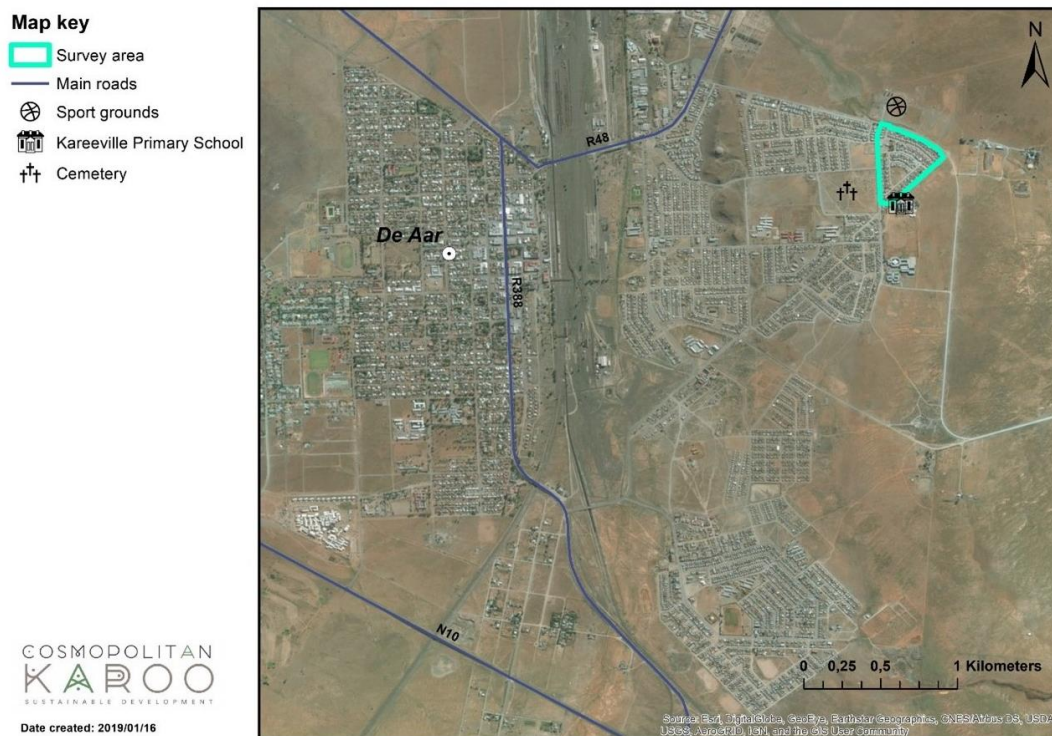
The significant social challenges that De Aar faces is another reason why it is an important research site. The local municipality has experienced a decline in skilled municipal officials and many local government posts remain vacant. They have also experienced a drastic increase in debt to Eskom due to non-payment, their infrastructure lacks the required upgrade as the system has not been maintained and the non-payment of residents has left the municipality with very little cash flow. As already noted, De Aar has recorded extremely high prevalence rates of Foetal Alcohol Spectrum Disorder (FASD) (Bateman, 2010; Isaacs, 2015; Kelly & Mian, 2016; Manoko, 2016). According to Janice Finlay, a previous Head of Economic Development at the Solar Capital farm outside De Aar, the 'rate is certainly linked to historical and socio-economic factors which have manifested in an area with a high unemployment rate, poverty, a culture of violence, dysfunctional families, and a sense of hopelessness' (Largest Solar Farm in Southern Hemisphere Launches In De Aar, 2016). A report by Skosana (2014) found alcohol-related violence, teenage pregnancy, and unemployment due to alcohol abuse to be prevalent in De Aar. While the investment in renewable energy facilities in the Northern Cape has created employment opportunities, Skosana (2014) quoted an engineer from one of the renewable energy construction company's who commented: 'Giving people jobs isn't a good enough solution because this simply means they have more money to buy drinks'.

Socially, the town's layout still reflects the racial divisions imposed during the apartheid era under the Group Areas Act of 1957 which provided for enforced residential segregation along racial lines. On the 9<sup>th</sup> of July 1965, the national government proclaimed group areas in De Aar, thereby dividing the town into a white residential area in the west and various townships for 'coloured' and black African residents to the east of the railway lines and station (Republic of South Africa, Government Gazette No 1175, 1965:3). Today these divisions remain, as can be seen in Figure 1.3 below. The white inhabitants of De Aar live in De Aar West, a middle-income neighbourhood adjacent to the town's business centre. A few middle-class black African and 'coloured' residents now also reside in De Aar West, where houses are much larger than those in De Aar East and a sense of higher social status is evident. The majority of the black population (broadly understood) lives in De Aar East, in older 'townships' characterised by state-built houses as well as in newer low-income housing projects and some informal settlements. This part of town is characterised by a general lack of infrastructure. People classified as 'coloured' in the apartheid era live

in several townships on the north-eastern corner while most black Africans live in a township called Nonzwakazi, which was established in 1978 (Department of Community Development, 1984).<sup>6</sup>

My study site, Kareeville, was built in 1977 on the outskirts of the town, some four to five kilometres from the town centre (*Diamond Fields Advertiser*, 1977). It is a triangle-shaped residential area that lies in the far north of De Aar East. (See Figure 1.3.) The residential area is cordoned off from other suburbs by the Kareeville Primary School, a cemetery, and a dilapidated sports ground.

Figure 1.3: Satellite image of De Aar depicting various residential areas and my study site.



Source: SARChI Research Chair in the Sociology of Land, Environment & Sustainable Development, 2019

The 2016-2021 'Integrated Development Plan' (IDP) of the Emthanjeni Local Municipality (2016:80) stated that all households in De Aar have basic electrification and are connected

<sup>6</sup> I acknowledge these are politically contested and value-laden terms to describe very broad categories of people. They continue to be used in government and official documents, making it difficult to avoid using them in certain contexts.

to the national grid. The municipality purchases electricity from Eskom, which it then sells on to local residents and businesses. It accesses the Eskom grid via the Hydra substation nine kilometres from De Aar, from where it is supplied to access points in each of its three towns. Electricity sales constitute the largest source of income for the Emthanjeni Municipality. In their 2020/2021 municipal budget they planned to earn just below R80 million for the financial year from electricity sales, R31 500 000 of this from the sale of prepaid electricity (Emthanjeni Municipality, 2020). However, as I have already indicated, the municipality has a maintenance backlog and faces a payment backlog to Eskom due to non-payment of electricity services to the amount of R106 million in 2021 (Nzo, 2021).

More than 4 000 indigent households within the municipality were expected to receive the Free Basic Electricity subsidy for the 2021/2022 financial year (Emthanjeni Local Municipality, 2021c). According to the municipality budget, electricity demand has grown in recent years due to the expansion and development of the municipality. These developments include the renewable energy projects surrounding the town as well as new low-cost housing developments in Hanover and De Aar.

#### 1.4.3 Renewable energy in De Aar

In 2010 the then Department of Mineral Resources and Energy (DMRE),<sup>7</sup> along with the National Treasury (NT) and the Development Bank of Southern Africa (DBSA), established the Independent Power Producer Office (IPPO) with the mandate to secure electricity from the private sector (IPPO, 2021a:1). The programme's primary objective is to secure South Africa's energy supply by diversifying from coal-fired electricity generation. The REIPPPP projects it oversees are also required to invest in local socio-economic development (SED) projects in five identified categories – education and skills, social welfare, health care, general administration, and enterprise development (ED) – but the extent to which local communities are benefiting from them, as the Department of Energy claims (2019:3), requires careful investigation on the ground. Critics of the REIPPPP's SED and ED initiatives cite the lack of proper project planning, monitoring, and evaluation (Lochner, Wlokas, de Groot, Dube & Scheba, 2017) as well as the arbitrary definitions of

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<sup>7</sup> The Department of Energy has undergone a series of name changes; see Chapter Four, Table 4.1.

'beneficiaries' and 'communities', which creates confusion as to whom the benefits should be directed (Tait, Wlokas & Garside, 2013).

As a result of the high radiation levels and strong wind in some regions, the Northern Cape Province is particularly well-suited for electricity generation from renewable energy sources. As of December 2021, it had thus attracted two thirds of the investment by Independent Power Producers (IPPO 2021a:10). In 2016 the then Mayor of De Aar noted that De Aar is a particularly favourable location for renewable energy projects because of its climate, environment and locality (Emthanjeni Local Municipality, 2016). The Eskom Hydra substation is the largest substation in the southern hemisphere, with a capacity of 765kV, and is currently being upgraded to accommodate the IPPs in the local municipality that have been designed to feed the power they generate directly to Eskom rather than through municipal substations.

As of 2019, the total REIPPPP investment in the municipality amounted to R12 967 million. In total, the municipality was projected to receive R2 406 million through local socio-economic development and enterprise development of which the benefits included 7 159 employment opportunities in the construction phase of the projects (Department of Energy, 2019:12). The four solar farms won their tenders during the first bid window of the REIPPPP programme in 2011. The smallest of them, with a capacity of 10MW, was built by Longyuan SA and Mulilo Energy Holdings and completed in October 2013. Mulilo and Longyuan SA are subsidiaries of the China-based company Longyuan Power. One of the solar farms (see figure 1.4) was built by Mainstream Renewable Power, an international company headquartered in Dublin, Ireland. This solar farm is being managed by Globeleq South Africa Management Services Ltd, which is a subsidiary of Globeleq, a UK-based company (De Aar Solar Power, 2015). This farm has a 45.6MW capacity and was completed in April 2014. A further two solar farms, with a combined output of 150 MW, were completed in April 2014 and April 2016; they are both run by Solar Capital, a local subsidiary of Phelan Energy Group Ltd, which is headquartered in Dublin, Ireland (Phelan Energy Group Ltd:2021).



Figure 1.4: Solar panels on the De Aar Solar Power farm, April 2018



Photographed by Stephanie Borchardt, April 2018 (with permission from De Aar Solar Power).

The two wind farms won their IPP bids during bid window 3 (a portion of the farms can be seen in figure 1.6). These wind farms have a generating capacity of 138.96MW and 96.48MW, respectively, and were both completed in November 2017. They are the first wind farms to be invested in, constructed, and operated in Africa by the Chinese state-owned power enterprise, Longyuan Power. These two wind farms generate enough electricity to satisfy the electricity demand of 300 000 households<sup>8</sup> (Brandstories, 2020) but the electricity generated by REIPPP projects does not go directly to local municipalities. In this case the electricity generated is fed into Eskom's Hydra substation and then dispersed across the country via the national grid. Figure 1.5 depicts the signage at the entrance of the Longyuan Mulilo De Aar wind energy facility (Maanhaarberg) when

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<sup>8</sup> Enough electricity generated to supply the Emthanjeni local municipality 23 times over or all De Aar households 56 times over.

I first visited the farm in 2018. The signage was subsequently changed and the new sign with the layout of the wind turbines can be seen in Appendix 1.

Figure 1.5: Longyuan Mulilo De Aar wind energy facility signage, April 2018



Photographed by Stephanie Borchardt, April 2018

Figure 1.6: Longyuan Mulilo wind farm (Maanhaarberg)



Photographed by Stephanie Borchardt, April 2018

While the investment in renewable energy facilities in the Northern Cape has created local employment opportunities, long-term employment remains sparse, and socio-economic upliftment opportunities for the residents are few. According to the IPPO (2021a), the IPPs investment is aligned with national development plans and priorities. The IPPO (2021a:31) notes that the average socio-economic development (SED) contribution is 2 per cent of the total revenue acquired over the 20-year contract of a renewable energy project. According to the IPP office (IPPO, 2021b:3), their contributions to SED amounted to R1.8 billion by the end of 2021. Their contribution to ED amounted to a R537.9 million investment in towns where renewable energy is generated, of which R27.2 million was spent between October 2021 to December 2021. This shows the huge investment that is currently taking place from which certain local NGOs are benefiting substantially. This has however caused some competition among NGOs for funding, with allegations around some consultants 'grabbing' certain developmental projects for themselves. In this context, making contact and obtaining information related to the REIPPPP within De Aar was not without its challenges. This will be discussed in the next chapter in section 2.4.4.

## **1.5 Chapter outline**

The dissertation unfolds across nine chapters. Chapters one to four can be regarded as framing chapters, covering, in sequence, the introduction to my study (this chapter), my research methodology in Chapter Two, my overarching conceptual framework in Chapter Three, and a review of the literature on South Africa's energy policy under the post-apartheid state up until 2010 in Chapter Four. Chapters five to eight present my research findings, beginning with a discussion of the challenges facing the local municipality (Chapter Five). This is followed by a discussion of my findings on energy poverty in Kareeville in Chapter Six (drawing mainly on my survey results) and Chapter Seven (drawing mainly on my follow-up interviews with individual households). In Chapter Eight I review my findings on the three IPPs operating around De Aar and their community development commitments. Finally, in Chapter Nine I review my findings and present my general conclusions, including some recommendations related to policy development and future research.

## Chapter Two: Research Design and Methodology

In this chapter, I review the mixed-methods, case-study research design I developed for my study. In the first section I provide a brief rationale for mixed-methods case-study research, followed by an overview of my fieldwork in section 2.2. In sections 2.3 – 2.6 I discuss my primary methods: a survey of 50 households in Kareeville that was designed to pay particular attention to their energy consumption patterns and energy challenges (section 2.3); semi-structured interviews (with Kareeville residents, municipal officials, representatives of local NGOs and renewable energy companies and farmers (2.4); observations in and around the town as well as via social media (2.5) and documentary and policy analysis (2.6). Finally, in sections 2.7 and 2.8 I discuss research ethics and reflect on the limitations of the study and challenges I encountered in the field. Here the outbreak of the COVID-19 pandemic in 2020 and the associated national lockdown between 2020 and 2021 were notable disruptions. The lockdown spanned my fieldwork phase and introduced constraints on in-person fieldwork that necessitated certain adaptations to my research design.

### 2.1 A mixed-methods case study research design

#### 2.1.1 The mixed-methods approach

I selected a mixed-methods approach as I was interested in collecting both quantitative data on household income and energy consumption in Kareeville as well as electricity usage and challenges in De Aar, and qualitative data on the lived experiences and views of people living in Kareeville as well as perspectives from informants in the municipality, NGOs and renewable energy companies.

According to scholars in the field of research methodology, a mixed-methods approach combines qualitative and quantitative data collection methods to expand the scope of data collection and avoid the disadvantages of using a single method (Creswell, 2009; Bryman, 2006; Bless, Higson-Smith & Sithole, 2014; Schoonenboom & Johnson, 2017). This approach was pioneered by Campbell and Fiske in 1959, when they made use of different

methods to study the validity of psychological traits. By 1979 the idea of mixing methods had turned towards the convergence of methods and choosing methods that would complement or reinforce each other's findings (Creswell, 2009). Creswell and Plano Clark (2007) provide the example of using informants' views collected through interviews to substantiate statistical findings from a survey. This is the approach that I have employed.

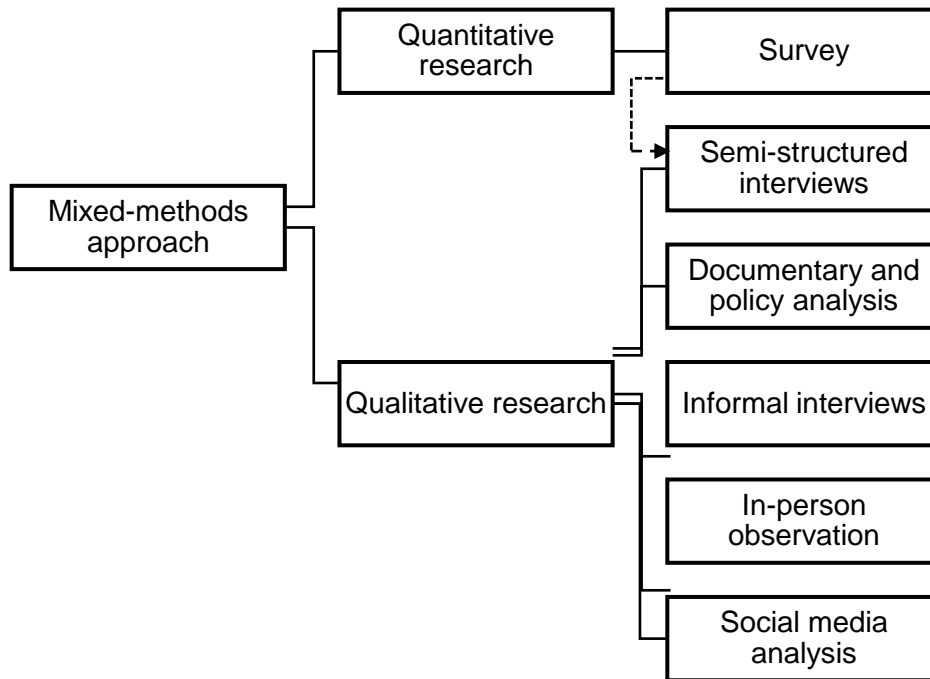
Mixing inherently different methods has garnered criticism from sceptics who maintain that certain methods are too different to combine. Some scholars argue that the methodological and philosophical differences between quantitative and qualitative methods make a true integration of findings impossible, a position described as the *incompatibility thesis* (Teddlie & Tashakkori, 2009:98). Advocates of mixed-methods research have vehemently rejected this thesis. For instance, Howe (1988) dismissed as unsustainable the claim that the positivist and interpretivist paradigms that underpin quantitative and qualitative methodologies respectively operate in pure silos. In arguing this he built on Campbell's (1974) argument that no research exists without some element of what can be termed 'qualitativeness'. However, Teddlie and Tashakkori (2009:98) noted that while the incompatibility thesis has largely been discredited by the many mixed-methods studies that have shown that it is possible to combine quantitative and qualitative data collection methods with good results, the thesis continues to influence contemporary debates on research methodology.

In my case, running a survey made sense as it would allow me to quantify the extent of energy poverty within my research site and to collect and aggregate data on individual household demographics, socio-economic status and energy consumption. At the same time, I also needed to make use of in-depth qualitative methods to capture the personal truths, perspectives, and stories of informants within those households as well as to explore a range of issues relating to local economic development, energy supply, and how the REIPPP programme was playing out locally. Qualitative methods often involve the analysis of text and words (Bless, Higson-Smith & Sithole, 2014:340). In this dissertation I used a variety of methods: semi-structured interviews, observation and documentary and policy analysis.

I conducted the household survey first, to obtain an overview of the issues in Kareeville relating to energy need, consumption, and energy challenges. I then analysed this data to identify residents from my survey sample with whom I could undertake follow-up interviews, with a view to obtaining a more in-depth understanding of their energy

challenges and household dynamics. I therefore used what has been described as sequential timing by completing all my quantitative data collection and preliminary analysis before returning to the field to embark on an extended phase of qualitative data collection. Figure 2.1 below provides a diagrammatic overview of my research methodology.

Figure 2.1: Diagram of the mixed-methods approach followed



### 2.1.2 Case-study methodology

According to Mills, Durapos & Wiebe (2010:xxxi), case study methodology was pioneered by sociologists at the University of Chicago in the 1920s. At this university sociologists studied the experiences of immigrants in the United States by selecting a small group of Polish immigrants and detailing their particular experiences, as a window onto migrant experiences more generally at that time. While this case study used only qualitative methods, by the 1930s medical researchers had begun to combine the case-study approach with research that employed both qualitative and quantitative methods to explore and describe a particular phenomenon. The emphasis was placed on obtaining as much data as possible through a suite of different methods, to describe, explore and analyse a particular case as fully as possible.

Feagin, Orum, & Sjoberg (1991:2) defined a case study as an “in-depth, multifaceted investigation ... [that] is conducted in great detail and often relies on the use of several data sources”. They argued that a case-study design allows for a more holistic inquiry into a set of complex social phenomena (1991:6). For example, Stake (1995) used biographical, ethnographical, holistic, and phenomenological data in a single case study. This is also an area where case-study design has been critiqued, with Yin (2009) noting that a case-study design can water down the academic rigour and objectivity required by the researcher. To avoid this, Yin (2009) proposes that a case study should be designed as a linear process, with predefined data collection techniques and pre-determined data analysis methods. While I would not argue against the value of research projects designed in this way, in my case I found some data collection methods emerging in the field, as unforeseen consequences arose and/or I found myself needing to adapt my initial plans out of necessity or in response to new phenomena. A significant example of unforeseen circumstances was the outbreak of the COVID-19 pandemic which forced municipalities to move some of their activities on-line, including council meetings, and drove me to pay more attention to social media (in this case Facebook) as a site for data collection. My research diaries also took on added value as a method for reflection as my fieldwork progressed.

Simons (2009) asserts that one of the strengths of a case-study research design is its flexibility and responsiveness to shifts in focus in the research and to unexpected circumstances. According to her, case-study research allows for a more grounded approach to data collection and permits the researcher to become embedded in social networks that are defined by the parameters of the case. Grounded theory, or a grounded approach, as described by Glaser & Strauss (1967:1), is an inductive approach whereby the discovery of theory arises from the data. Urquhart (2012:7) states that many researchers erroneously assume that grounded theory implies entering the field with a blank slate. Rather, grounded theory emphasises the importance of “letting the data speak to the researcher rather than for the researcher to force theories on the data” (Urquhart, 2012:7).

In the end the parameters of the case study are defined by the researcher in relation to various aspects of the case. My case study encompasses the neighbourhood of Kareeville, which is where I explore the issue of household energy poverty in De Aar. However, it also extends to include the local municipality and the six IPPs surrounding the town, because of my interest in looking at household energy poverty in the context of

South Africa's evolving policies on renewable energy as part of its energy mix. In this regard, one of the reasons why I chose De Aar as a research site is the fact that the six IPPs lie so close to the town. In many cases the wind and solar farms that have been constructed in terms of the REIPPPP are situated far from their 'host' towns and/or tucked away behind fencing on private land, for instance the two wind farms that feature in Malope's (2022) case study of Loeriesfontein, which are situated 50 kilometres from the town, on a dirt road that is not often used by townspeople. In De Aar, the IPP facilities impinge on the town, and it was impossible for local people not to be aware of their construction.

## **2.2 Fieldwork overview**

My fieldwork spanned five years from 2017 – 2021. It began with two scoping trips in June and September 2017 when I was still registered as a MA student. My survey was conducted with Kareeville residents in October 2017, after which I entered a phase of analysing my data. I returned to De Aar in April 2018 to conduct face-to-face interviews with selected respondents which I then proceeded to integrate into my analysis and write up as part of my MA thesis. I subsequently applied to upgrade my MA to a PhD in September 2019 which was duly approved in February 2020. At this point the COVID-19 pandemic struck, and I found myself unable to return to De Aar to continue my fieldwork, because of the restrictions on travel and face-to-face interaction imposed by the ensuing national lockdown. In this time, I began to rely on social media as a way of keeping informed about developments in De Aar. I was also required to update my ethical clearance from the Research Ethics Committee at Stellenbosch University, to accommodate my new degree programme and the restrictions imposed on face-to-face research as a result of the COVID-19 pandemic.

My application for ethical clearance was submitted in March 2020, with approval finally granted in August 2020. (See Appendix 2). I was thus only finally able to return to the field in April and May 2021. At this time, I focused on conducting follow-up interviews with municipal officials, NGO and IPP staff. I also incorporated questions about funding in my interviews with NGO staff members as the funding they had been receiving from the IPPs was severely restricted during the COVID-19 pandemic, with support being restricted to



the provision of Personal Protective Equipment (PPE) (an issue that is discussed in greater detail in Chapter Eight).

My engagement with the relevant scholarly literature and documentary and policy analysis predated and continued throughout my fieldwork.

### 2.2.1 Scoping trips and survey site selection

My first scoping trip to De Aar ran from 4–7 June 2017 and the second from 15–21 September 2017. The purpose of these trips was to make initial contact with the municipality, introduce myself to NGOs that are involved in various social intervention programmes in De Aar, and identify informants who could guide me in deciding which residential area would be best suited for my study. However, although I attempted to set up preliminary meetings with various municipal officials and local representatives of the renewable energy companies in De Aar, I quickly realised that I was going to face challenges in terms of who I would be able to interview within these organisations. This was because I was mostly met with silence from key individuals whom I thought would be well-placed to assist me. Despite this, I was able to meet with several key informants who were helpful and provided me with valuable insights in this time.

On my second scoping trip I was taken on a guided tour of De Aar by a local informant who had lived in four of the poor residential areas in De Aar East over time and offered me advice as to the conditions I would encounter on that side of town. The informant confirmed the prior advice I had received, that Kareeville would be a suitable research site. Before I finally settled on Kareeville as my survey site, I also discussed the relative merits of individual neighbourhoods with informants in two local NGOs, the Foundation for Alcohol Related Research (FARR) and the Ethembeni Community & Trauma Centre, as well as with an employee at one of the solar farms. My selection of Kareeville as the site for my household survey thus relied on purposive sampling, based on the knowledge I gathered during my two scoping trips to De Aar (Babbie, & Mouton, 2009:166).

I chose Kareeville because it proved to be the best fit with the aims of my study. There were four main sets of considerations at work. Firstly, I required a low-income neighbourhood in which households have formal access to electricity, given that my study was investigating the electricity consumption of households, along with the general energy challenges residents face. Secondly, I needed a neighbourhood that was predominantly

Afrikaans speaking, both because this is consistent with the language profile of the Nama Karoo (Hill & Nel, 2018) and because it would mean that I would be able to conduct the survey and follow-up interviews myself. Afrikaans is my first language whereas doing the survey in isiXhosa would have required a translator to accompany me. Thirdly, I quickly realised during my scoping visits that my own safety had to be a consideration as well. This was a concern that was voiced by various townspeople I encountered during my scoping trips as well as by staff at both FARR and the Ethembeni Community & Trauma Centre. Since I was not using research assistants, the residential area had to be safe enough for me to access by myself on foot so that I could go door-to-door to administer the survey.

Finally, as I wanted to explore local perceptions of renewable energy and knowledge of the presence of renewable energy companies in De Aar, I needed to consider the proximity of my chosen neighbourhood to the infrastructure and community projects associated with the IPPs operating around the town. I was also hoping I might encounter people who had worked for one of the renewable energy projects during its construction phase in my survey site. During my scoping visit I established that Solar Capital was the only renewable energy company to have opened a community centre in De Aar. This centre was situated right next to the Leeuwenhof and Sunrise neighbourhoods, but these areas were described to me as 'where the teachers stay'. The working-class residential areas closest to the community centre were Kareeville, Barcelona, and Montana, with Kareeville considered by the NGO workers I interacted with as the one that would be the safest for me to visit alone.

### 2.2.2 Research diary

As part of my fieldwork, I kept a diary in which I described my daily routine and recurring keywords and phrases that participants used, and also noted methodological challenges while in the field. A fieldwork or research diary is not usually considered a critical tool of the research process, but it has been argued that the value of keeping a diary cannot be overstated (Browne, 2013; Borg, 2001; Engin, 2011; Newbury 2001; Burgess, 1981). According to Newbury (2001:3), the research diary 'can be seen as a melting pot for all of the different ingredients of a research project – prior experience, observations, readings, ideas – and a means of capturing the resulting interplay of elements.' The diary (or diaries in my case) proved a useful tool at the end of each day of fieldwork for reflecting on the interviews that I had conducted. Being able to refer back to my notes helped curb my

anxiety over how the interview process was going and allowed me to feel better prepared for my interviews set for the following day.

According to Borg (2001), a research diary also offers emotional support to the researcher, especially researchers who work in isolation and cannot discuss their thought processes with others or voice the concerns that arise for them during fieldwork. This was certainly my experience. My research diaries provided me with a healthy outlet in which I was free to articulate my frustrations and feelings about the challenges I faced while in De Aar. An equally important function of the research diary is that it supports the researcher's continued engagement with their research site at later stages when away from the field and throughout their research journey. With the help of my diary, I was able to revisit my fieldwork and immerse myself back in De Aar while I was writing up my study in Cape Town.

## **2.3 The household survey**

Babbie (2004:243) notes that a survey research design is appropriate when a researcher intends to gather information from a population that is 'too large to observe directly.' Survey research designs have been criticised for being empiricist, inherently positivist and lacking the ability to obtain meaningful aspects of social interaction (Bryman, 2006:159; De Vaus, 2002:7; Babbie, 2003:275). However, my household survey was an integral part of my mixed-methods study. Without it I would not have been able to develop a baseline overview of socio-economic dynamics in Kareeville, nor gain information regarding household energy sources, the problems associated with each source, and the level of awareness about the renewable energy sector in my research site. The survey also allowed me to identify households with particularly interesting dynamics that I could approach for follow-up interviews. As already indicated, my in-depth interviews with Kareeville residents were with participants with whom I had previously interacted as respondents in my survey.

### **2.3.1 The sample**

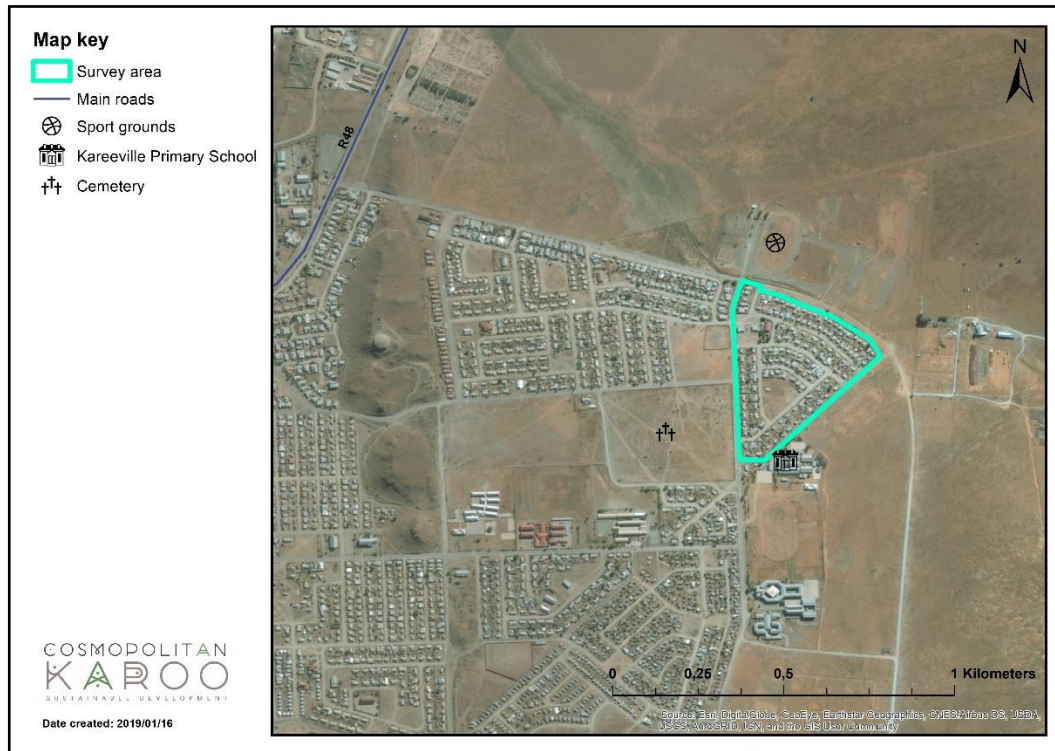
When it was first established, Kareeville was reported to consist of 292 sub-economic houses (*Diamond Fields Advertiser*, 1977). The map that was provided to me by the local

municipality showed a total of 257 plots for the whole of Kareeville. During my second scoping trip, once I had identified it as my survey site, I did a reconnaissance of the township in which I counted 137 houses in Kareeville Extension 10. I therefore decided on a target of one third of the households, which would mean 45 households had to be surveyed to provide me with a sample of a little over one in three households which I considered sufficiently robust for my purposes given the homogeneity of the community in terms of history, social identity and income. However, after successfully piloting my survey with five households, I decided I was able to incorporate the data that that generated into my study. The total number of households that formed part of my survey was therefore 50 households.

Figure 2.2 below shows a satellite image of Kareeville, with Kareeville Extension 10 outlined in turquoise. As can be seen in this image, my site comprises nine streets of varying length. My sampling strategy was based on the principles of random selection, with my approaching every third household with the aim of selecting at least a couple of households on each street. This proved to be a challenge as residents were not always home, and some houses (on Elm, Bloemkom and Denne streets) were not accessible as I could not reach the front door behind high fences. I also encountered numerous refusals. Some people would make an appointment with me and provide a time which they said would suit them but when I showed up, I would be waved away. Other people would request that I meet with them over the weekend which I sadly had to decline as I had been warned by NGOs, local municipal officials, and the LED manager of one of the renewable energy companies that it would be unsafe for me to conduct fieldwork over the weekend irrespective of the time. Weekends were very clearly signalled to me as a time when I should regard Kareeville as off limits to me. In the same vein, I was also cautioned by various local informants to conduct my interviews during working hours, preferably between 10 a.m. and 4 p.m., as my safety might be called into question if I stayed later. I thus had to adjust my approach to fit into the available windows of opportunity and be more flexible with regard to my sampling strategy.

Conducting the survey during working hours meant that the majority of my respondents were over 30 years of age and unemployed or pensioners. However, I do not regard this as a limitation as the survey was not about personal experiences but intended to gain information from individuals who were knowledgeable regarding their households' energy needs and fuel usage. The employment status of the survey respondent was not relevant for responses regarding the household's energy consumption.

Figure 2.2 Satellite image of Kareeville showing Extension 10 outline in turquoise



Source: SARChI Research Chair on the Sociology of Land, Environment and Sustainable Development, 2019

In the end I managed to meet my target of 50 completed survey questionnaires with respondents from Kareeville. Having spent time wandering through Kareeville, including beyond Extension 10, I am confident that the data I collected through the survey does justice to conditions in this neighbourhood regarding household energy usage and energy challenges. As my discussion in Chapter Six shows, the data I collected on the socio-economic profile of households is compatible with information on the town and local municipality more generally, thereby increasing one's confidence in the robustness of the survey data. My mixed methods design also means that I was able to probe issues around decision-making and differences in consumption priorities and awareness of their impact on household budgets among household members through my qualitative interviews.

While my findings cannot be extrapolated directly to other low-income residential areas in De Aar or to other towns in the Karoo where utility-scale renewable energy is produced, they do provide a strong foundation for analysing the energy challenges facing poor households in this region. In this regard, although extending the study was beyond what I could do for this dissertation, given the constraints of time and the limitations imposed by

the COVID-19 pandemic, a useful follow-up study would be to replicate my survey in other residential areas of the town and thereby broaden the investigation of household energy poverty across racial boundaries in De Aar. It would also be useful to replicate the survey in other towns hosting REIPPP projects, to extend further the analysis of the tensions around investing in IPPs in energy-poor communities in the current energy dispensation. This could also benefit the IPPs by highlighting the development needs of their host communities, to guide them in designing their SED and ED efforts.

### 2.3.2 Questionnaire design

As I am bilingual in Afrikaans and English, I developed the survey questionnaire so that it could be read in both languages. However, all my respondents indicated their preference to be interviewed in Afrikaans. As already stated, to address data reliability I piloted my draft questionnaire with five households in Kareeville over one day in October 2017, to test whether the language was comprehensible for participants and to identify any faults with the logical flow of the questions or possible gaps. Through this I established that there were no structural or formatting issues, that participants understood the questions clearly and that questions had a logical flow. However, I was also able to observe that participants had very little to no knowledge of the renewable energy companies in De Aar. I therefore included additional probes and open-ended questions, to spark more of a conversation about these issues with respondents. These questions were rephrased and presented to the five pilot households as well. The additional changes were minimal, and I therefore felt justified in including the five pilot households in the final sample for analysis.

The final questionnaire is attached as Appendix 3. It contains both close-ended and open-ended questions. Close-ended questions are admired for imposing uniformity on respondents' answers and are useful for the collection of basic data related to demography, household structure, assets, services and livelihoods (Creswell, 2009; Creswell and Plano-Clark, 2011; Fowler, 2009). Groves, Fowler, Couper, Lepkowski, Singer and Tourangeau (2009) have criticised close-ended questions for not being able to capture meaning, but they are useful for particular purposes, including developing a basic overview of socio-economic conditions at a particular point in time. My open-ended questions were designed to gain a more in-depth understanding of respondents' views and experiences with regard to their needs and to probe their views relating to renewable energy in general and the renewable energy sector in De Aar in particular.

In designing the survey, I attempted to exclude technical and unfamiliar terms relating to renewable energy, to avoid confusion on the part of my respondents which would undermine the accuracy of the data I captured (Iarossi, 2006:37; Groves et al, 2009:228). As shown in Appendix 3, section D (question 21), only one question involved renewable energy as a concept and not a technology, with participants being asked to describe what they thought the concept meant. The logic of including this question was to gather information on participants' understanding of renewable energy, given that solar farms had been operational outside their town and supplying electricity to Eskom since 2014. It was anticipated that there would have been some consultation from the side of the renewable energy companies with local people in this time. Participants could complete the questionnaire whether they knew what the term renewable energy meant or not.

### 2.3.3 Data analysis

After I had conducted the survey, I coded the answers to the open-ended questions and created a codebook in preparation for the processing of the data collected through the survey by means of the data analysis tool, IBM Statistical Package for the Social Sciences (SPSS). The primary function of the survey data was to describe Kareeville residential area, and therefore the data was analysed through univariate analysis and descriptive statistics. Frequency tests were run on SPSS version 25 to gather the data relating to demographics, household structure, financial income, and energy fuel usage.

My data analysis included descriptive statistics and crosstabulations to depict frequencies and ages for men and women. This is because gender dynamics were of interest and, based on my literature review (presented in Chapter Three), women are often the energy users responsible for cooking, heating water for washing, and overseeing lighting and the heating of space. Age, education level, income and reliance on state grants were also issues of interest and were calculated through the same methods.

Pie charts, histograms, and bar charts were generated in order to establish frequencies relating to residents' energy sources, energy challenges, and knowledge of the renewable sector in De Aar. Quality assurance entailed running descriptive statistics to test all variables for missing data values and to check that all values were correctly entered.

## 2.4 Semi-structured interviews and engagement with key informants

Semi-structured interviews were a core component of my data collection methods. My household survey was complemented with in-depth follow-up interviews with 17 respondents from 15 households in Kareeville. I also conducted interviews and held informal discussions with a range of informants in the local municipality and the NGO sector throughout my fieldwork and engaged with a small number of staff in two of the three renewable energy companies operating around De Aar and with several farmers leasing their land for renewable energy projects. These encounters can be broken down as follows:

- Six staff members at three NGOs in De Aar
- Six officials in the Emthanjeni Local Municipality
- Two staff members of a solar energy company
- Three local farmers.

I chose a semi-structured design as it provided me with a structured mechanism for obtaining basic background information on all my informants (for instance, demographic information) while also allowing for an open-ended discussion on the particular issues I wished to explore further with the different sets of informants. This gave participants an opportunity to develop their views in conversation with me, allowing for a richer discussion. In addition, the semi-structured format allowed me some flexibility in following up on issues, themes and stories that emerged during the interview.

All the interviews were based on informed consent through a consent form that was available in either Afrikaans or English. Interviews were also recorded on a voice recorder, based on informed consent (Appendices 4 and 5). Interviews conducted in April 2018 were transcribed by TransExec<sup>9</sup> for further analysis. Interviews conducted in 2017, 2020, and 2021 were transcribed by me. Research ethics are discussed more fully in section 2.7 below.

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<sup>9</sup> TransExec is a translation and transcribing service based in Cape Town, South Africa. See Appendix 6 for the Confidentiality Agreement for Transcription Services Provider that I used.



#### 2.4.1 Follow-up interviews with Kareeville residents

My semi-structured interviews with Kareeville residents were essential as they not only allowed me to clarify certain issues arising out of the household survey but also provided rich additional data and introduced a narrative element around people's experiences that complemented and extended my survey findings.

As already noted, I relied on purposive sampling to identify the survey participants I wished to interview further but had to make some adjustments in the field. I wanted a diverse set of residents in terms of household income and size, energy usage and consumption patterns and individual knowledge related to renewable energy, as recorded in the survey. Working with these considerations I identified individual respondents in 15 households but ended up not being able to interview two of them. One was unavailable and in the other case, I felt unsafe returning to this particular house because of an unpleasant incident that had happened during my survey fieldwork. (The incident is briefly discussed in section 2.7 below.) Informants in two households I had identified as potential back-ups were then interviewed in their place. In two households I ended up conducting joint interviews with the original survey respondent and another household member (in one case her husband and the other case her sibling) who was interested and knowledgeable about certain issues (Rebecca and Alexander and Steven and Samantha in Table 2.1). My interviews took place from 16 to 20 April 2018.

Table 2.1 below sets out details of my respondents' age, gender, occupation, and household size. Pseudonyms are used in all cases.

Table 2.1: Kareeville respondents in follow-up semi-structured interviews

<b>Pseudonym</b>	<b>Age</b>	<b>Gender</b>	<b>Household size</b>	<b>Occupation</b>
<b>Lisa</b>	74	Female	15	Pensioner
<b>Rebecca</b>	52	Female	7	On a disability grant and not employed
<b>Alexander</b>	53	Male	7	Domestic worker at the Department of Labour
<b>Steven</b>	49	Male	11	Unemployed (searching for work)
<b>Samantha</b>	59	Female	11	Domestic worker in the informal sector
<b>Mia</b>	33	Female	7	Unemployed (searching for work)
<b>Emmie</b>	31	Female	9	Unemployed (searching for work)
Claudia	30	Female	5	Studying full time and not able to work
Janet	37	Female	6	Unemployed (searching for work)
Bernard	55	Male	12	General worker for the local municipality
Luke	48	Male	2	On a disability grant and cannot work
Olivia	60	Female	9	Pensioner
Cherise	42	Female	2	Stay-at-home mother
Marie	52	Female	7	On a disability grant and cannot work
Zoey	Mid 40s	Female	12	Unemployed (searching for work)
Hendrik	35	Male	4	Unemployed (searching for work)
James	77	Male	2	Pensioner

These interviews (see Appendix 7 for the interview schedule) were guided by my preliminary data analysis of the household survey data and what that showed with regard to household income and energy usage and challenges. I wanted to select households that could be regarded as 'typical' for Kareeville, while also allowing for certain outliers with regards to fuel usage, household size and reliance on social state grants. While the residents I selected as respondents did thus not constitute a representative sample, the interviews I conducted with them were invaluable for deepening my insight around household energy challenges, energy usage, and gender and generational dynamics relating to energy usage.

These interviews took place either inside respondents' homes or outside to accommodate the few interviewees who were busy with household tasks such as doing the washing, preparing food on a fire, or chopping firewood. I was surprised that all my respondents recognised me when I knocked again on their doors and could recall my previous visit during my survey. In the words of Hendrik, however: 'You don't forget when a white person willingly comes to your area' (Interview, 18 April 2018). This made the interview process easier to initiate. The length of these interviews ranged between 20 and 60 minutes. The reason why some interviews were short was because I had already spoken informally to those interviewees during the survey. This meant I could be more direct in my questioning and the respondent understood what I was referring to.

During my write-up of these interviews, I decided to make use of extended narratives to present the issues and dynamics that were raised in my interviews with seven of the 15 respondents (from five households because in two households I ended up conducting joint interviews). These seven respondents are listed first on Table 2.1. I have used these narratives, which I have described as 'vignettes', to provide deeper insight into my respondents' own accounts of their lived experience of household energy poverty over time. These vignettes are presented in Chapter Seven.

#### 2.4.2 NGO informants

Initially my informal interviews with NGO staff were aimed at finding out more about the socio-economic challenges in De Aar and the various residential areas and their characteristics. During my formal interviews with them I wished to obtain a better understanding of how these organisations engaged with the renewable energy companies and how they perceived the REIPPPP's contribution to 'development;' in the town.

The two organisations I interacted with, the Foundation for Alcohol Related Research (FARR) and the Ethembeni Community & Trauma Centre (see Appendix 8 for the semi-structured interview schedule), were both partly funded by Solar Capital (See Louw, 2019). My engagement with the Trauma Centre extended to an interview with the project manager of Ulonwabo Drop-In-Centre which is a subsidiary of the Ethembeni Community & Trauma Centre that provides overnight shelter services to vulnerable children and abused women. (All the names provided are pseudonyms although only three of my NGO participants requested that their identity remain confidential. The fragility of the funding relationship between the NGOs and their government and REIPPPP donors was

mentioned as the reason for the request. The NGO employee stated that both funding sources might be threatened if they were seen to be speaking ill of either their IPP or government donors. Table 2.2. below summarises information on these interviews.

Table 2.2: NGO interviews

<b>Pseudonym</b>	<b>Age</b>	<b>Occupation</b>	<b>Date interviewed</b>
Lizette	48	Project manager of FARR in De Aar	20 April 2018
Janice	56	Development worker at Ethembeni Centre	24 April 2018
Fiona	49	First responder trauma and care at the Ethembeni Centre	24 April 2018
Crystal	29	Development worker at Ethembeni Centre	24 April 2018
Frederick	44	Project manager of Ethembeni Centre	4 May 2021
Sheila	32	Project manager of Ulonwabo Drop-In-Centre (at the Ethembeni Centre)	4 May 2021

The interviews were conducted at the Ethembeni Community & Trauma Centre<sup>10</sup> and at FARR's Joan Wertheim Centre<sup>11</sup> (less than two kilometres from Kareeville). During both my formal interviews and informal interaction with my NGO informants, I was welcomed and provided with refreshments. Both NGOs appeared eager to assist me in locating a residential area safe enough but also relevant to my research inquiry. During my first visit to FARR, which was during my scoping trip in 2017, I was with a group of fellow students and FARR drove us all to the Community Centre then sponsored by one of the IPPs, Solar Capital, to meet with the Local Economic Development Manager of Solar Capital (discussed further in Chapter Eight, section 8.4). Five of the six interviewees were female. One identified as white, two identified as black African and three identified as 'coloured'.

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<sup>10</sup> See Appendix 9.

<sup>11</sup> See Appendix 10.

Figure 2.3 below depicts the sign outside the Ethembeni Community & Trauma Centre that was sponsored by Solar Capital as part of its SED commitments in 2016. (I return to this signage in Chapter Eight.)

Figure 2.3: Signage sponsored by Solar Capital for Ethembeni Community & Trauma Centre



Photographed by Stephanie Borchardt, September 2017

### 2.4.3 Municipal officials

The purpose of my interviews with representatives of the Emthanjeni Local Municipality was to gain a better understanding of the development challenges, problems around local energy infrastructure and supply and the budgetary issues related to energy supply for both the municipality and the town of De Aar. (The interview schedule is reproduced as Appendix 11.) As already indicated; these interviews were not part of my initial fieldwork when I was still registered for a MA. These interviews were directly and indirectly very informative about a range of challenges within the municipality which are discussed in Chapter Five. During these encounters, both formal and informal, I also heard various stories about corruption and/or maladministration which I was not in a position to verify but were nevertheless revealing about tensions and the challenges facing the municipality. I was also confronted with the ethical challenge of respecting peoples' rights while not

exposing my informants to possible harm. In addition to using pseudonyms, I have also chosen to blur the positions of my informants in the municipality.

Interviews with local municipal officials were initially difficult to secure but as I spent more time in De Aar and popped into the municipal offices with requests for information, people became more relaxed about answering some of my questions. I first approached the Emthanjeni Municipal Manager via email in 2018, to explain the nature of my research and to request an interview. He was not available for an interview but directed me towards other officials who could possibly assist. I found that once we started talking a few officials were eager to discuss the inner workings of the municipality with me and interviews could run much longer than the 40 minutes I had indicated on my 'informed consent form' - in one case lasting over two and a half hours. A few officials had an open-door policy and would always make time to meet with me.

Overall, these interviews were very useful in helping me understand the politics and power struggles not only within local government structures but also between the IPPs and the municipality. Through them I was also able to gain insights into the working environment in the municipality and the pressures on officials to perform. I remember walking into one official's office in 2017 and being shocked at the state of the office. The room was large, but the entire floor was packed with folders and files, some piling up to the height of his desk. My informant must have noticed my facial expression as he was quick to explain, without my asking, that he had only recently been employed in his position and the documents would be attended to. He stated that he still had to make sense of some of the files. When I returned four years later to interview another newly appointed official, I was met with the same situation with piles of unfiled documents plastered over the floor and desks.

In all I was able to interview five employees formally over the course of my fieldwork, two of them more than once. All were middle-aged and male; three were black African and three 'coloured'. (See Table 2.3 below.). Saturation was however reached with regards to the municipal officials' perspectives of the renewable energy independent power producers in De Aar and the extent of their economic development initiatives.

Table 2.1: Emthanjeni staff interviews conducted (pseudonyms in all cases)

<b>Pseudonym</b>	<b>Area of work</b>	<b>Date</b>
Daniel	Economic Development	20 October 2017 23 October 2017 26 April 2018
Eugene	Economic Development	19 October 2017 26 April 2018 04 May 2021
Cobus	Infrastructure (2017)	23 October 2017
Justin	Communication services	16 June 2020
Abraham	Community services	4 May 2020 (telephonic)
Richard	Electro-technical services (2021)	6 May 2021

#### 2.4.4 Representatives of renewable energy companies in De Aar

I developed a separate interview schedule for the renewable energy companies, with the hope that I would be able to interview representatives from all three IPP companies operating around De Aar. (See Appendix 12.) The purpose of these interview was to gain insights regarding their social responsibility and corporate investment strategies in De Aar and their views on collaboration with the local municipality and the renewable energy sector more generally. I was particularly interested in interviewing the staff who are responsible for local SED and ED projects. However, securing access proved to be very difficult here as well, an experience that was not unique to my project. (On this see Malope, 2022; Nzo, 2021; Stuurman, 2018). Despite repeated efforts to contact staff at different levels in the three renewable energy companies, including their local economic development officers, renewable energy engineers, media liaison officers, and directors, I struggled to make contact and once I had made contact, I found employees were not open to being approached for meetings. Table 2.4 below provides details of the two interviews I was able to secure.

I was eventually able to establish contact with a staff member in Solar Capital (Patrick in Table 2.4) after I had been introduced by an NGO staff member whose programme was

funded by that company. He turned out to be informative and I was able to interview him twice. In the case of De Aar Solar Power, a manager at the solar farm (Matthew in table 2.4 below) invited me to their solar plant in April 2018. On this day I was fortunate to receive a tour of the facilities by an intern and to meet with the plant manager who spoke with me briefly about their operations. He was reluctant to be interviewed on the topics in my interview schedule but was open to a broader discussion on renewable energy and the operations of the solar farm. He also directed me to the company's Director of Economic Development for further information. At the end of a five-minute phone call with the Director, she agreed to allow me to conduct interviews with key individuals within the company. However, I first had to send her my interview schedule, for her to forward to the relevant personnel to answer. This meant I had to revise my schedule to be more of a questionnaire-style document, with direct questions, rather than the aide-memoire for the open, conversational style of discussion that I had hoped for. In the end, despite my sending the questionnaire and numerous follow-up emails to both the Director and the plant manager in De Aar, I never heard from either again. I was, therefore, unable to conduct interviews with anybody at the company apart from my brief and informal discussion with the plant manager.

Regarding the wind energy producer, Longyuan Mulilo, I tried various channels to make contact on several occasions. The first attempt was in March 2018 when I received an email from a colleague with an attachment of a public notice from Mulilo inviting the public to the first Annual General Meeting (AGM) of its Mulilo Trust (See Appendix 13). The notice had two email addresses and five contact numbers for follow-up. I sent an email in April 2018 but never received a reply. The phone numbers were either inoperable, not answered or, on one case, answered by somebody who did not speak English. As indicated in the next section, I did, however, get an informal tour of the Longyuan Mulilo substation.

Table 2.4: Interviews with renewable energy company staff

<b>Pseudonym</b>	<b>Occupation</b>	<b>Company</b>	<b>Date</b>
Patrick	Economic development manager	Solar Capital	23 June 2018 06 May 2021
Matthew	Solar plant manager	De Aar Solar Power	25 April 2018



#### 2.4.5 Farmers leasing land to renewable energy companies

I had not originally planned on interviewing the farmers who were leasing their land to the renewable energy companies as infrastructure sites but one evening in April 2018, when I was taking photographs of wind turbines on a dirt road between two farms, I had a chance encounter with one such farmer which led to this. This was a notable example of how unplanned encounters can expand the scope of one's enquiry in the field.

In this case the farmer, Jaco, who is leasing his land to Longyuan Mulilo, spotted me and jumped out of his vehicle to come and speak to me. After I had explained my research, he invited me to his farm the following day. He welcomed the idea of an interview and gave me a tour of the wind farm on his land and also provided me with photographs that he had taken during the construction phase for use in my dissertation (Appendix 14). He spent more than an hour providing me with an in-depth account of the construction phase of the wind farm, including the number of explosives that were required to create craters large enough for the mounting of the wind turbines. He was, however, pleased with the construction overall, as the wind farm company also built a dirt road network for him across his farm. This made it possible for him and his farmworkers to reach certain areas with a truck instead of on horseback. After he had given me a tour of his farm, he called an engineer based at the Longyuan Mulilo substation near the farm. The engineer welcomed me to the control centre, and I received a tour of their facilities. Unfortunately, he declined to be interviewed as he believed he was not the correct person to supply the information that I wished to obtain.

This farmer also provided me with contact details for three other farmers. I was thus able to employ a form of snowball sampling to identify other farmer respondents. All my informants were white, male and middle-aged (as can be seen in table 2.5). One, who was leasing his land to a solar company, was initially open to an informal discussion but later declined on the grounds that he was happy with the renewable energy company and had nothing of value to add to my inquiry. The other two agreed to being interviewed during my field trip to De Aar in May 2021. At this time new information had emerged related to the farmers' lease contracts with the renewable energy companies which the local municipality was scrutinising (discussed further in Chapter Five). The interviews covered the farmers' involvement with the IPP process, their lease agreements with the wind energy companies as well as their experience of the construction phase of the wind farms and their views on the success of the REIPPPP.

Table 2.5: Farmer interviews in De Aar and Philipstown

<b>Pseudonyms</b>	<b>Age</b>	<b>Occupation</b>	<b>Date interviewed</b>	<b>Place</b>
Jaco	42	Farmer	3 May 2021	His farm, De Aar
Gerhard	Mid 50's	Farmer	3 May 2021	His farm, De Aar
Stefan	62	Farmer	4 May 2021	His farm, Philipstown

#### 2.4.6 Qualitative data analysis

For the analysis of my qualitative data, I employed a thematic approach to identify emergent and recurring themes. These interviews were all transcribed by me and a transcription service (As previously mentioned in section 2.4). According to Ryan and Bernard (2003), the easiest way to identify a theme is repetition – if a concept, specific term, or issue appears regularly across participants' transcripts it is worth looking carefully at this as a potential theme. Ryan and Bernard (2003) further state that a natural transition between topics can also be classified as a theme.

I used a form of colour-coding to identify recurring concepts in my transcriptions and signal both similarities and differences across the interviews. Glaser and Strauss (1967) describe this as the constant comparison method. It involves systematically comparing data units to each other by asking why and how they differ. After basic themes were clustered, I combined the data from the open-ended questions in my survey and the data from my interviews to identify larger overarching themes with subthemes. Recurring words that participants used were added to a spreadsheet to ensure that not only my research concerns but also the concerns of residents were captured. My focus was on the energy needs and challenges of Kareeville residents but if I found another concern kept recurring during my interviews, I captured it as a theme that had to be addressed. I also triangulated the data that I obtained from informants, municipal official interviews, survey data analysis, literature review, and field work observation.

## 2.5 Observation

### 2.5.1 Immersing myself in my research site.

While I did not think of observation as a major method during the initial conception of my research design, it turned out to be immensely important. Walking around town I was able to witness the still deep-rooted racial divisions in the social composition of the town. While people from different class and racial groups mix in the town's business centre, residential areas are clearly divided along race and class lines. I also witnessed significant events on the town's calendar, such as SASSA (South African Social Security Agency) grant payout days and an annual matric dance which took place in the town hall. The latter event was clearly an important occasion in the life of the town for more than just the high school students who attended (See Figure 2.4).

By 'hanging out' in De Aar at coffee shops and restaurants I was able to meet people who could either provide me with contacts or became informants themselves. On occasion I was also able to follow up on interview requests as a result of chance encounters. For instance, one evening in 2021 I bumped into a renewable energy company employee at a restaurant who admitted to ignoring my email requests but agreed to speak to me since I was in De Aar. Lingering in the municipal waiting rooms for many hours until I could speak to officials also helped me secure interviews with people who did not reply to my interview requests but were open to a discussion once they saw me in De Aar. During my fieldwork, I would also regularly run into informants at a major supermarket in the town. The town is small but seeing my respondents nearly three times a week in a situation unrelated to an interview made me feel awkward. I felt that I was encroaching on their personal space and therefore tried to do my shopping during their working hours.

Figure 2.4 Matric Dance at the De Aar town hall, 2018



Photographed by Stephanie Borchardt, April 2018

I was also able to visit one solar farm outside De Aar in April 2018, after contacting De Aar Solar Power via its general email address. On the day that I visited the solar farm, a ground crew of about six people that had been contracted as general workers for the day was on site. They were responsible for clearing the shrubs and tall grass growing between the solar panels. I was met by an engineer from De Aar Solar Power and directed to an intern who provided me with a tour of the solar farm and facilities. During the visit, I could view the solar panels and ask questions relating to the construction of the site. After the tour, I was invited into the engineers' office and spoke to the head engineer regarding maintenance and employment opportunities for local people at the solar farm. What I found interesting was the small number of people employed to work permanently at the solar farm. I had expected to see more than 10 people on site. However, while I was not provided with a precise number, I only met five: the engineer, the intern, a cleaner and two security guards at the gate. While limited, this was more than I had observed at the wind farm I visited in 2018, where there was not a single employee on site – instead, the staff were based at a Mulilo-built substation tucked away in a valley some three kilometres from the nearest wind turbine.

I must therefore emphasise the importance of my staying in De Aar, speaking informally to numerous individuals regarding the topic of my research, and making sure that I was

being seen. I drove a vehicle with a large Stellenbosch University logo on both sides of the vehicle which I found helped give my presence in the town a kind of unofficial authorisation. I was also stopped on more than one occasion by residents who were curious to know why I was there. In Kareeville itself I decided to leave my car parked near a piece of open veld on the edge of the neighbourhood and walk everywhere, because I wanted to be able to talk to residents casually and immerse myself in their surroundings. The first day that I piloted my survey questionnaire, some residents assumed I had to be a representative of a political party canvassing in the area. I was also asked on more than one occasion for the food hamper that the political party had allegedly promised, which some residents had not received. This led me to decide to wear a 'uniform' comprising a Stellenbosch University sweater and baseball cap with the university logo during my fieldwork. While this made me stand out, it also helped me when approaching residents for interviews. The sweater was particularly uncomfortable during the heat of the day but because I found it helped me gain access, I continued to wear it even when the temperature reached 30 degrees Celsius.

### 2.5.2 Social media and observation

On-line observation via social media emerged as an important research method during the later stages of my fieldwork. During the COVID-19 pandemic the municipality shifted much of its communication to an on-line platform, making use of livestream videos on the social media platform, Facebook. Livestreaming events took place from March 2020 onwards, most of them focused on awareness raising around the COVID-19 pandemic and safety protocols. However, later in the year and in 2021 they focused on council meetings related to the annual draft budget. More serious conversations around infrastructure were also streamed in 2021 regarding water shortages and electricity maintenance and stability issues.

While these online meetings were poorly attended by residents, averaging around 10 people per session, I found them invaluable as they allowed me to keep up to date with developments in De Aar during the lockdown period, including challenges facing the municipality and some concerns of the public. The meetings were recorded and through thematic analysis I was able to identify the key concerns from residents which were raised during the question-and-answer session. Thematic analysis also allowed me to cluster the concerns of the local municipality regarding their infrastructure and financial budget.

Table 2.6 below summarises the online meetings I attended.

Table 2.6: Facebook live streaming videos attended.

<b>Date</b>	<b>Focus of online meeting</b>
09 March 2021	Annual draft budget consultation
15 March 2021	Update on water supply challenges in Hanover and De Aar
30 March 2021	Update on the electricity outages
05 May 2021	Update on potholes and road conditions
19 May 2021	Financial updates on the budget
25 May 2021	Update on the qualified audit report
07 October 2021	Introduction of the new mayor

The first event I attended on-line, the meeting on 9 March 2021, was attended by the municipal speaker (Monika Kivedo), the then mayor (Sipho Sithonga), and the municipal manager (Izak Visser). This event was particularly useful for my research as they discussed the municipality's draft budget for the 2021/2022 financial year. The meeting took place at the Ulwazi radio station in De Aar and the radio host also encouraged residents to phone in with their questions for the municipal representatives. Some residents voiced their gratitude to the municipality during the live event for making such events available and providing updates.

Most of the Facebook meetings were conducted in both English and Afrikaans. The absence of isiXhosa was contested by people on social media platforms but at the first event the radio host was able to translate the municipal officials' statements into isiXhosa. Language was experienced as a barrier to participation by some who commented on-line on the need for isiXhosa translation services.

## 2.6 Documentary and policy analysis

I made use of documentary analysis to gain insight into relevant national policy development and debates as well as international developments relating to global concerns around climate change and the significance of the renewable energy sector in response. The policy analysis also aided my historical overview of policy development in South Africa regarding energy and renewable energy. By drawing on national, district and local government policy and legislation; I was able to order a timeline of events and contextualise the policy development trajectory. As noted by Bowen (2009:32), documentary analysis entails utilising both thematic and content analysis; it goes beyond simply noting facts and aims to interpret and triangulate findings from one's respondents. Policy analysis was particularly useful for triangulation with regard to my findings from my interviews with the REIPPP companies and local government officials. Being familiar with the content of energy policies and legislation was important for being able to analyse the national policy framework against its practical implementation on the ground.

Documentary and policy analysis continued throughout my study and influenced how I employed certain concepts such as 'sustainable development', 'energy poverty', and 'scale'. Also important were the proposals and reports by the IPPs regarding the socio-economic development (SED) and local enterprise development (ED) commitments of large-scale renewable energy facilities however the individual IPP reports were not analysed. I had anticipated that the literature on SED and ED programmes previously and currently being run and funded by the REIPPPP companies would be made available to the public and open to dissemination, but it became apparent during my fieldwork that information relating to all the programmes currently being funded in my study area was not available in the public domain and could not be accessed. The lack of transparency related to SED and ED programmes is discussed further in Chapter Eight.

I also consulted archival sources as I found only a few secondary sources regarding the history of De Aar. I visited the Western Cape Archives and Records Service in 2019 and the Kimberley Africana Library in 2021 and was able to source images of De Aar and the railway junction at the McGregor Museum in Kimberley<sup>12</sup>. While I have only included a few

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<sup>12</sup> See Appendix 15 for consent to use the images in my dissertation.

archival details and photographs in this dissertation, the archival sources provided me with valuable insight into and appreciation of the history of De Aar as a once thriving railway hub and town.

## **2.7 Research Ethics**

I have abided by Stellenbosch University's Research Ethics Guidelines and the Code of Ethics of the International Sociological Association (ISA) and conducted my study in terms of their principles. This includes the importance of protecting the dignity of my participants and minimizing any potential risks to them. Because my interviews were conducted face-to-face, a guarantee of anonymity could not be made; however, confidentiality has been maintained by using pseudonyms and identifying information has been removed from my records, questionnaires, and interviews where appropriate.

My research proposal was submitted to the Departmental Ethics Screening Committee (DESC) and Research Ethics Committee (REC) of Stellenbosch University for ethical clearance which was awarded in 2017 and updated in August 2020 to run until January 2023 (Appendix 16). The REC approved my dissertation as a low-risk study. The household information on people's understandings of renewable energy and energy usage and consumption that I collected is not of a sensitive nature. The municipal and corporate information I required for my research also lies in the public domain. The ethical clearance to conduct face-to-face interviews that was granted on the 17<sup>th</sup> of August 2020 specified the COVID-19 protocols for face-to-face interviews and the fieldwork that I conducted in May 2021. As already noted, some of my interviews were transcribed by a transcription services company which signed a confidentiality agreement which can be viewed in Appendix 6.

Informed consent, both verbal and written, was obtained from all participants before I conducted my survey and semi-structured interviews. Participants were provided with documents explaining the purpose of my study and their rights as a participant. These documents were in both English and Afrikaans, with participants provided with a copy in their chosen language. I also memorised my consent form for the few participants who could not read or write, so that I could recite the document to them to obtain their verbal



consent. I still provided these residents with a copy of the document as they told me that it could be read by their children who stayed with them.

In terms of data security, I ensured that the information I collected in the field was kept confidential by securing it in a zipped file on my password-protected laptop. In my data analysis and write-up, I have endeavoured to ensure that the privacy and dignity of my participants are respected by using pseudonyms and have erred on the side of caution by detaching identifiable data from references to them as far as possible, where deemed appropriate. I have also respected institutional protocols for visits and interviews with staff of the renewable energy companies as well as the local municipality by obtaining the necessary permission first (Appendix 17).

## **2.8 Reflections on my fieldwork**

While rich and rewarding in many respects, my fieldwork proved more challenging than I had initially anticipated. Doing research during the COVID-19 pandemic was stressful in a number of ways. In addition to the personal challenges everyone was experiencing in negotiating this public health crisis, it threw out my scheduling around follow-up fieldwork and in-person interviews in 2020 when national travel restrictions were in place. Because of it, I needed to adjust my research ethics protocols and apply for the renewal of my REC clearance which was a time-consuming process. I was, however, allowed to conduct in-person research in 2021 provided I adhered to regulations around the wearing of masks, respecting distance protocols, and following health and safety protocols during interviews, for example, the use of hand sanitisers.

A different order of unexpected challenges lay in accessing information and securing interviews with key informants in the renewable energy companies and NGOs in De Aar as well as the local municipality which I discuss more fully in the next section, 2.8.1. The problems I encountered here were not expected as my preliminary scoping trip had introduced me to several potential 'gatekeepers' who appeared receptive to my research at the time. In the sub-section that follows (2.8.2) I present a sketch of a particular day of fieldwork in Kareeville during my survey. The sketch is based on what I wrote in my research diary after I had returned to the place where I was staying. I have chosen to present it both because it speaks to the stressful nature of doing fieldwork as an outsider

in an environment such as Kareeville and because it is revealing of local dynamics that are part of the everyday life of my respondents.

### 2.8.1 Problems with access to information that should be in the public domain.

The first hurdle with accessing information was to secure interviews with the appropriate people in De Aar in the renewable energy companies, the NGO sector, and the Emthanjeni Local Municipality. I regularly arranged meetings in advance from Stellenbosch only to find the interviewee was either unavailable when I arrived in De Aar, or not in town or had cancelled the meeting without letting me know. On other occasions I would find that the agreed meeting time or venue had been changed at the last minute. Although potential interviewees would indicate email as their preferred means of communication, they would often not respond to emails, and I had to revert to cell phone calls to communicate. All this made it very difficult to plan as I was constantly having to improvise to accommodate people's schedules. While I recognised that I could not expect other people to accord my research project the same importance as I gave it, I experienced this behaviour as often unprofessional and indicative of a reluctance to be open to public scrutiny.

As already indicated in section 2.4.4. a particular challenge during my research was accessing information regarding the SED and ED programmes of the renewable energy companies that were operating around De Aar. The lack of transparency I encountered was similar to that experienced by Malope during his research on similar issues in Loeriesfontein. According to Malope:

[greater transparency is essential...its absence is indicative of a general lack of trust and accountability around decision-making processes across all levels. Greater transparency would not only facilitate acceptance of renewable energy by the general public but is also a prerequisite for meaningful cooperation between renewable energy companies and their "host" communities] (Malope, 2022:205).

I was always careful not to ask any of the companies for financial documents as I recognised that this was corporate information that they would be unlikely to be willing to share. I did, however, expect that information on all the socio-economic development and enterprise development programmes funded by the three renewable energy companies would be in the public domain and readily available. To my surprise, I was told during an interview that the IPPs do not have to disclose this information. I was told by the only

company that replied to my request for information relating to their SED and ED reports that these documents were not for public consumption and only the IPP office could provide me with access. I contacted the IPP office on numerous occasions regarding the REIPPPP reports related to my study area in 2020 and 2021. Here I was told that they would be willing to provide me with these reports, but I needed permission from the renewable energy company in question first. I then returned to the companies and asked for permission but my communications with them went unanswered.

This run-around, coupled with restrictions on fieldwork because of the COVID-19 pandemic, meant that I have not been able to undertake an in-depth comparative analysis of local development projects that the renewable energy companies have been running, as originally intended. The companies do post reports on their socio-economic impact programmes on social media platforms such as Facebook and Twitter and their respective websites. However, these articles are of a public-relations nature and do not provide detailed information regarding all the programmes that are being run. While I would hear about new projects and programmes that were being launched by word of mouth during my fieldwork, I could not always see information relating to these projects on company social media platforms. The three renewable energy companies also vary greatly in the extent of their engagement on social media platforms. Thus, although I have endeavoured to present the renewable energy companies as accurately as possible, it must be noted that most of my material on their activities has been gathered from company websites.

This limitation regarding information that should be in the public domain was compounded by the difficulties I encountered in setting up interviews already described above. Although I was never refused an interview outright, I felt I was being sidestepped in my attempts to access documents that I argue should be open to scrutiny. While I view the lack of information available as a limitation of my study, it is also revealing of the way the REIPPPP is structured and how transparency and public accountability are limited. This will be discussed in more detail in Chapter Eight.

During my interviews with informants working in the NGO sector I found that they were comfortable discussing their views of the renewable energy companies. However, they were unwilling to share their funding agreements with these companies or provide details of the financial assistance that the renewable energy companies provided. I found this odd as the renewable energy company in question had no problem printing massive A1 posters laying out details of their funding to this NGO in the community hall they had sponsored.

One NGO employee constantly requested that I keep certain information we were discussing off the record, out of fear that their funding from the renewable energy sector would be jeopardised. At the same time, she was very keen to talk about their experiences of working with both the renewable energy companies and the municipality, often raising issues that went beyond the questions I was asking.

My difficulties setting up meetings with municipal officials have also been described above. This also limited my access to information on the challenges facing the municipality but was revealing of internal stresses and tensions as well as uneasiness about perceived scrutiny. On one occasion it became apparent during a scheduled interview that the municipal official I was interviewing had forgotten about another meeting with his manager. My informant introduced me to the manager, and I was immediately grilled with a series of questions regarding my research and why I had come to speak with this person. He noted that he had arranged the meeting with me some time in advance and would not be able to attend the meeting with his manager. The manager then left with the instruction that he must 'be quick'. I scrambled to prioritise my most important questions but two minutes later I was instructed by the manager to leave, and my informant was told to go to the other meeting. As I anticipated, I was subsequently not able to reschedule my interview with this person, with my emails regarding follow up meetings unanswered.

### 2.8.2 A stressful day in the field

The following sketch captures elements of the constant inner turmoil I experienced in my fieldwork as I negotiated the competing pressures of reaching my deadlines and being an exemplary researcher while often feeling trapped in situations in which I was afraid to be myself, because of fears about how I was being perceived and how this might affect my research. At the same time, it also expresses something of the rawness of life that I observed as I walked around the streets of Kareeville.

The encounter I describe here took place late in the day in October 2017, during my household survey which I conducted entirely on my own, without backup in the field. By this stage on this particular day, having been refused interviews at the previous five houses I had approached, I was feeling down in the dumps. It was yet again a very hot day, and I was uncomfortable in the Stellenbosch University 'uniform' that I had opted to

wear.<sup>13</sup> I stared at my wristwatch, practically wishing the hour away. I told myself if I could only get one more resident to survey, then I could go home. I was driven only by the fact that I had to meet my target if I were to reach 50 completed questionnaires in two weeks (weekends excluded as I had been told by residents that that was too dangerous due to excessive drinking and rowdiness).

I walked along the littered and dusty road looking for any willing residents. Very few people were outdoors as the heat had forced them to seek solace inside. I kept my winter jacket with the Stellenbosch University logo on as it had helped with gaining access, but the sweat was irritating, and droplets had formed on my brow. The dogs, however, were alive and barking. I pitied the dogs: malnourished, scared and full of ticks and fleas, they too had a hard life, much like their owners whom I was interviewing.

I saw an elderly woman standing near her broken fence, watching me. She looked away as our eyes met and continued staring at the open field in front of her. Ah-ha, I thought, a resident eager to be interviewed. I marched over and gave her my usual speech with a bright smile and a friendly introduction. She agreed to the interview, and I silently congratulated myself on having found another resident willing to be surveyed.

The constant barking of the neighbour's dog made it difficult to interview her. To get away from the dog and the noise, I asked the woman if she would like to sit in the shade, but she refused, stating that she had to see the field. If I had not been so tired, I might have paid attention to her comment and asked a follow-up question, but I had a whole questionnaire to get through and time was not on my side. I knew I was on the verge of cracking. I had spent a full week in the litter-strewn dusty township and not managed to reach my interview target. I was behind in my schedule and could not leave without meeting my data collection commitments.

The dog continued barking and growling throughout the interview. The woman made no effort to shush it, and it was not my place to do so either. The neighbours weren't home, and after all, I didn't want to show the interviewee that I was agitated by the constant barking as it appeared she had become used to the noise. The woman was not interested

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<sup>13</sup> In addition to the outfit described above, I am also referring here to the persona adopted of being extroverted and overly friendly.

in the questions I asked, and only responded with one-word answers. Technically this was fine as most of the questions were closed-ended. The heat was now really getting to me. I was standing on one side of the fence, and my informant on the other. She had not welcomed me into her yard. I continued but loathed this experience.

I had almost reached the halfway mark in the questionnaire when suddenly my interviewee announced loudly that I had to leave. I was baffled. Was it something I had said, or was the previous question too sensitive? Without asking, she stated that her son was involved in a gang initiation and that she was watching the field to see when he would come home. She didn't elaborate, and I felt that my safety would be at stake if I dared to stay any longer. I asked if I could interview her the next morning or another time when she would be available. I wanted to complete this interview. Not because I had put any particular effort into it or because of any interesting things that emerged during our discussion. She was just a number now, and I needed this interaction to count.

At this point the police showed up in two squad cars. The woman was unmoving, not even batting her eyes. She told me to leave and never return. She told me that she now knew that the police were watching her home. That meant her son must be close. I thanked her, and as the police vehicle stopped at her gate, I walked away, feeling utterly crushed that I had lost. This was not about the wasted survey paper, the time I had lost, or the fact that I had spent almost half an hour in the scorching sun with no result. This was a defeat; I was not going to get the one last interview for the day that I had set out to achieve.

I looked back at the woman and saw the two officers approaching her fence. Suddenly, the neighbour's barking dog sprang loose. It ran straight for me. I knew not to run as that would only cause the dog to chase me. I tucked my interview material tighter under my arm, and with my right hand, grabbed the taser in my front pocket. I was not planning on using it on the dog. I thought that the mere sound of the taser would scare it. As I was about to take the taser out, I noticed a lot of people had gathered outside. People had crept out of their homes, and it felt as if everybody was standing in their yards, close to their fences. This was not because a white person in a township was about to be attacked by a dog. This was about the woman, her son, and the police.

But now, the dog had a few spectators. Nobody tried to stop it as it lunged at me, grabbing me by the left ankle and dragging me. I could not kick it. There were too many people watching. While it might have been okay for the owner to kick the dog, it was certainly not

okay for a white person to come into the community and kick a resident's dog. Yes, I was being attacked, but all I could think about was how this would be perceived by the community. Word spreads fast through these small communities, and I did not want my actions to influence the remaining interviews that I still had to acquire.

There I stood, utterly defenceless, by my choosing. I left the taser and never took it out. I also did not want to alert anybody to the fact that I was carrying one. I looked down at the dog as it was yanking my ankle, repeatedly trying to break the skin. Somehow, I managed to keep myself upright. I then decided to simply turn around and walk away and pretend that the dog did not exist. Foolish or daring, it felt like a big risk. The dog let go of my ankle and before it could attack again, I turned around and started walking. I continued walking slowly down the dusty road. Tears started to form as I was in pain. I had had enough. The dog left my ankle alone but continued to stalk me. Running up behind me and growling but then retreating again. I tried as best I could to continue walking without looking crippled. My ankle was on fire, but luckily there was no blood. I was wearing my hiking boots and either the thick sheep wool socks had offered some protection, or the dog did not have too many teeth left.

The dog finally left me as I reached the end of the road, and I cried. I tried not to, but I could not stop myself. I wanted my sunglasses so I could hide my red, teary eyes from the world. Unfortunately, I had left them in the car. I had read somewhere that sunglasses make one seem less approachable as they hide your eyes. Something I had not wanted in Kareeville, especially as an interviewer. I kept on walking, straight to my vehicle, with all the finesse and poise of a confident woman. I reached my car, turned on the air-conditioning, and drove straight to the guesthouse, to nurse my wounds and finally allow my tears to flow.

As this sketch shows, my fieldwork experience was far more demanding than I had anticipated. While I was welcomed into many people's homes with friendliness and interest, there were times when my research site felt extremely hostile. This was not only in Kareeville itself but also in my efforts to engage with the IPPs. In both contexts I knew that my actions were being watched and I had to put additional effort into how I presented myself, what clothes I wore, how I spoke and the vocabulary that I used in each encounter. Judith Butler's (1990) concept of 'performativity,' albeit applied to gender performance, rings true for my positionality as an interviewer and my performance of myself as a

researcher in various social contexts. The performativity of my fieldwork also led to severe exhaustion that required me to take short breaks so that I could feel myself again.

My childhood can be described as a sheltered one, away from much of the hardship facing many South Africans. My experience of doing research in the Karoo has, therefore, profoundly shaped my perspective on the nature and extent of poverty in this country, as I have been exposed to the harsh conditions in many communities in this region. I have also witnessed extreme racial tensions amongst people and while I was not blind to the evidence of this before, the time I have spent in the Karoo has brought home to me the long path that must still be trod in search of social justice for all.

## **2.9 Conclusion**

In reviewing my research design, I am confident that the mixed methods approach I adopted has allowed for a more in-depth and balanced study than either a purely quantitative or qualitative study would have enabled. By conducting the survey before my qualitative interviews, I was able to select respondents for my follow-up interviews in Kareeville whose households reflected important considerations that were consistent with my survey findings. It also made my access to these Kareeville residents easier. Most were eager to discuss their energy needs and challenges and I found these interviews were far easier to conduct than those for the survey, as residents were already familiar with my interests. Thematic analysis of these interviews also allowed me to be open to concerns that were of importance to the participants.

Being adaptable and flexible in my research approach also exposed me to a wide variety of research methods. The challenges around accessing data on De Aar led me to archival sources which deepened my understanding of the town. The COVID-19 pandemic was tragic for many people across the globe and in South Africa and introduced difficulties for me, but it also had a positive spin-off for my research by forcing the Emthanjeni Local Municipality to shift their meetings onto a social media platform which allowed me to stay up to date with developments in De Aar. That said, the extent of the reluctance from key stakeholders in the REIPPPP to divulge information was an unanticipated challenge that was difficult to work around. The lack of transparency with regard to the programme's SED and ED commitments is of concern.



## **Chapter Three: Conceptual Framework: Sustainable Development and Energy Poverty**

As indicated in Chapter One, my underlying concern in this dissertation is to explore the extent to which South Africa's turn towards renewable energy as an increasingly significant component of its energy mix can contribute to sustainable development in a poor community such as Kareeville – through the provision of electricity that is affordable, reliable and environmentally friendly in the first place, but also through the local SED and ED commitments that the REIPPP programme requires. Sustainable development and energy poverty are thus key concepts that require unpacking. In engaging with these concepts, I have also found myself having to engage with the concepts of scale and gender and address the legacy of South Africa's minerals-energy complex (MEC) in shaping the country's dysfunctional and inequitable electricity dispensation.

I begin my conceptual framework with a discussion of sustainable development, here focusing on the work of Holden et al (2016; 2018) while also paying attention to various criticisms of the very idea that 'development' can ever be considered sustainable. Thereafter, I address the concept of scale as a useful tool for looking at South Africa's energy dispensation, including the different ways in which the REIPPP programme operates at the national, provincial, and local levels. In section 3.3, I engage with literature relating to energy poverty, including the gendered dimensions of energy consumption, with women typically the primary energy managers within households (Eberhard & Van Horen, 1995; Spalding-Fecher, Williams, & Van Horen, 2000; Annecke, 2000, 2008, 2009; Annecke, Abrahams & Mohlakoana, 2010; Mohlakoana, 2014; Phillips & Petrova, 2021). Finally, in section 3.4 I engage with the MEC and the way in which it theorises the unsustainable development pathway that has characterised South Africa's industrialisation, which the post-apartheid state has inherited and, arguably, failed to turn around.

## 3.1 Sustainable Development

### 3.1.1 The origins of the concept

The concept of sustainability was originally developed to refer to the conditions that must be present for an ecosystem to sustain itself over an extended period (Holden and Linnerud, 2007:176). When coupled with 'development' in the phrase 'sustainable development' has been extended to the need to ensure that development policy and initiatives respect the inter-dependence between environmental and socio-economic issues and do not damage the sustainability of ecosystems. More critical engagements with the term have extended the idea of sustainability to the social world itself, which is where I locate Holden et al's work. Holden et al's conceptual and design of a sustainable development model has developed over several years and appeared in various publications (Holden & Linnerud, 2007; Holden, Linnerud & Banister, 2013; Holden, Linnerud & Banister, 2014; Holden, Linnerud & Banister, 2016; Holden, Linnerud & Rygg, 2021). I draw mainly on their 2018 book, *The Imperatives of Sustainable Development: Needs, Justice, Limits*, which provides the most complete account of their proposed sustainable development model (Holden, Banister, Linnerud, Schwanitz & Wierling, 2018).

The term sustainable development has been widely used over the last 40 years. It was first used in the 'World Conservation Strategy' developed in 1980 by the International Union for the Conservation of Nature (IUCN), the United Nations Environment Programme (UNEP) and the World Wildlife Fund (WWF) (International Union for Conservation of Nature, 1980) and quickly grew in popularity, featuring in other global policy reports. The concept was, however, met with some scepticism as critics argued that it overemphasised the economic sphere. In the 'World Conservation Strategy' the environment was subordinated to humans' need for natural resources which had to be properly managed to sustain economic growth (World Commission on Environment and Development, 1987; Hopwood, Mellor & O'Brien, 2005; IUCN et al., 2008). 'Development' was equated with economic development, which poor countries needed to uplift themselves from poverty.

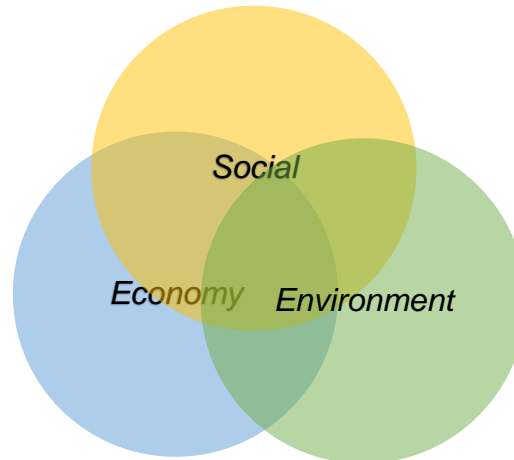
The concept of sustainable development was popularised by the United Nations' World Commission on Environment and Development (WCED) in its 1987 report, *Our Common Future*, which also took on board concerns that the environment was being subordinated

to economic development. The WCED report, also known as the Brundtland Report, thus emphasised the importance of not seeing the environment as something outside the realm of human action. This report further emphasised the strain that unfettered economic development puts on natural resources such as forests, water and land. As Gro Brundtland, the Chairperson of the WCED, noted in her Foreword to the Report "environment" is where we all live; and "development" is what we all do' (WCED,1987: Chairman's Foreword). Accordingly, the Report argues, humans cannot develop without using natural resources, but economic development must be undertaken sustainably, to ensure that future generations' requirements for natural resources are not compromised.

In the Brundtland Report (WCED, 1987) sustainable development is defined to encompass satisfying basic human needs and ensuring long-term ecological sustainability as 'vast numbers of people in developing countries... have legitimate aspirations for an improved quality of life'. Basic human needs are defined to include energy, water supply, employment, food, housing, sanitation, and healthcare but the Report also extends beyond focusing simply on basic survival by acknowledging the aspirations of people to advance their goals for a better life. The Report includes a chapter on energy ('Energy - Choices for Environment and Development') which problematises the continued reliance on fossil fuels to meet energy demands and highlights the seriousness of the energy issues that the world was already facing in the 1980s. It thus points to the need to mitigate the harmful effects of fossil fuel usage and to shift towards more sustainable forms of energy resources to meet human needs.

Figure 3.1 depicts the tripartite model for sustainable development that flows from the Brundtland Report. This model is also referred to as the Triple Bottom Line (TBL) or the three-pillar model.

Figure 3.1: The tripartite model of sustainable development



While this depiction of the intersection of the environmental, social and economic spheres does not appear in the Brundtland Report itself, it has become the dominant way in which the interplay between these spheres has been depicted, following the publication of the WCED report. In this model sustainable development requires all three pillars to perform sustainably and a balance to be struck among them; in the diagram the centre where the three 'pillars' overlap represents the sustainable development sphere where this balance has been achieved. Ivanova (2005) and Rogers Jalal & Boyd (2008) have argued that it is also important that each of the three pillars functions effectively in its own right.

The WCED indicated the growing concern globally around the need to promote sustainable development and address the rising crisis of high levels of inequality. In response to these concerns, the United Nations (UN) published its Millennium Developments Goals (MDG) in the year 2005.<sup>14</sup> The MDG set out eight global goals with a 15-year time frame for their achievement (UN, 2005). The goals were broadly aimed at addressing poverty and providing upliftment for marginalised groups. The MDG's were not all achieved by 2015; goals such as reducing environmental degradation, addressing climate change, providing basic services and reducing poverty continued to elude many countries (UN, 2015a:8). However, some improvement in areas such as access to primary education, improving maternal health and combating HIV/AIDS and malaria had shown the positive impact of setting internationally recognised goals.

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<sup>14</sup> The United Nations Millennium Declaration was signed in 2000 but the report was published in 2005 (United Nations, 2005).

While the MDG agenda had concluded in 2015, the UN then set out a new set of targets to guide global commitments to sustainable development. The UN launched targets and indicators for a new set of Sustainable Development Goals (SDGs) in 2015 to replace the earlier Millennium Development Goals (MDGs). The goals were developed after the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012 and are set out in the UN document titled, *Transforming our World: The 2030 Agenda for Sustainable Development* (UN, 2015a). This Agenda encompasses a set of 17 universal goals that target the environmental, political, and economic challenges that the world faces (Figure 3.2). Sustainable Development Goal 7, 'Affordable and Clean Energy', aims to ensure 'universal access to affordable, reliable and sustainable energy' and to increase 'the share of renewable energy in the global energy mix and double the global rate of improvement in energy efficiency' (UN, 2015a:7.1-7.7a). The goal is to achieve this by 2030.

According to the 2030 Agenda, the seventeen SDGs are to be regarded as all equally important for building a pathway towards sustainable development. However, one of Holden et al.'s (2018) criticisms of the SDGs is that they are presented as a set of uncomplicated objectives into which countries, corporations, and sponsors of developmental projects can simply slot their projects, in a tick-box exercise. To them it is also not self-evident that the goals are all equal, nor that they should all receive the same amount of attention.

Figure 3.2 The 17 Sustainable Development Goals of the United Nations



Source: UN (2022).

### 3.1.2 Criticisms of the concept of sustainable development

The body of literature that is critical of the concept of sustainable development that has dominated global policy debates since the Brundtland Report first appeared is extensive. (See, for instance, Lafferty, 2004; Rogers et al., 2008; Dahl, 2012; Biermann et al., 2012; Holden et al., 2016, 2018). Here I point to major points of criticism in the general literature, before turning to Holden et al.'s critical engagement with the concept and the revised model they put forward to replace the tripartite model shown in Figure 3.1 above.

With specific regard to the Brundtland Report, Lafferty and Langhelle (1999:9) argue that it overemphasises the importance of ensuring equity between generations, across time, whereas it should rather have focused on the challenge of ensuring equity in the present, i.e., within the current generation. This refers to the definition of sustainable development that the WCED developed which has been widely adopted ever since, that 'Sustainable development seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future' (WCED, 1987: Para 49). They argue that the focus on social justice between the generations that this definition puts at the centre limits the concept of sustainable development because the importance of context and specificity in addressing development challenges in the present is lost. While acknowledging the importance of the Brundtland Commission as a document that emphasises the need for countries to commit to sustainable development. Lafferty and Langhelle (1999) are therefore critical of the way the concept of sustainable development has been taken up and caution against using it as an analytical tool. Subsequently Lafferty expressed concerns about the blanket usage of the term. According to him, sustainable development 'is now like "democracy": it is universally desired, diversely understood, extremely difficult to achieve, and won't go away' (2004:26).

Some critics have been much harsher, to the extent of describing the concept of sustainable development as an oxymoron (El Chami, 2021; Spaiser, Ranganathan, Bali Swain, Ranjula & Sumpster, 2016; Redclift, 2005; Njiro, 2002; Clayton, 2001). By this they mean that it is a contradiction in terms; the concept of sustainable development reveals unsustainable thinking. Redclift (2005) provides the following illustration of this. While sustainable development is presented as being about meeting the needs of all people, its proponents also state that people must define their needs based on their different cultures, with the following consequence:

If in one society it is agreed that fresh air and open spaces are necessary before development can be sustainable, it will be increasingly difficult to marry this definition of 'needs' with those of other societies seeking more material wealth, even at the cost of increased pollution (Redclift, 2005:214).

Redclift (2005) also criticises the Brundtland Report for being vague. Its call to satisfy basic human needs for current and future generations does not consider changes in the needs of future generations, as 'sustainable development' practices take effect. Nor does it recognise that understandings of needs vary, and meeting one person's needs does not equate to meeting another person's needs.

Linked to the concern around vagueness, Dahl (2012) argues that the concept needs to be accompanied by precise targets that can be measured and adjusted as required over time. The SDGs can be seen as a response to this latter concern. However, they have been criticised for setting up so many targets that governments and corporations are able to pick and choose those they wish to address; some are also inconsistent with each other. Holden (1998) argued that the constant reviewing and setting of sustainable development targets reduced sustainable development to a planning theory, forever trapped in a cycle of adding and subtracting new targets to be met. For Holden, therefore, the concept must encompass 'doing'. Holden et al. (2016; 2018) have defended the value of the concept but argue that it needs to be radically reconceptualised, a position which I endorse. Their normative model of sustainable development is discussed in the next section.

### 3.1.3 Holden et al.'s revised model of sustainable development.

Holden et al.'s model of sustainable development has evolved over a body of work involving different combinations of collaborating authors at different times. What follows draws from this body of work, particularly more recent texts (2016; 2018).

While Holden and his co-authors are critical of international conceptions of sustainable development since 1987, they choose to work with and refine the concept rather than reject it out of hand. Thus, in their 2018 book, *The Imperatives of Sustainable Development: Needs, Justice, Limits*, the authors maintain that the Brundtland Report was indeed a step in the right direction and not all the criticisms against it are fair; the concept of sustainable development is complex and operationalising it remains challenging.

However, for them the WCED was still too comfortable with the way that modern society uses natural resources and failed to recognise the scale of the ecological threat and the need for immediate action to address that.

In this text the authors argue that the goals of sustainable development have actually been weakened since the release of the WCED report in 1987, in that there has been a shift away from 'our common future' to 'a future that we want' (Holden et al., 2018: xiv). The goal of justice, not only for future generations and those living in poverty now, but also for those that cannot speak, such as plants and animals, has been diluted and is no longer core. They also condemn the lack of urgency placed on the need to recognise the environmental limits to development. Major research since the 1980s (Meadows, Meadows, Randers, and Behrens, 1972; Lovelock, 1979) has identified the environmental thresholds that cannot be breached without jeopardising global welfare, yet not enough is being done to prevent human behaviours that cross these thresholds. (On this see Steffen, Sanderson, Tyson, Jäger, Matson, Moore III, Oldfield, Richardson, Schellnhuber, Turner & Wasson, 2004; Steffen, Crutzen & McNeill, 2007; Rockström, Steffen, Noone, Persson, Chapin, Lambin, Lenton, Scheffer, Folke, Schellnhuber, Nykvist, De Wit, Hughes, van der Leeuw, Rodhe, Sörlin, Snyder, Costanza, Svedin, Falkenmark, Karlberg, Corell, Fabry, Hansen, Walker, Liverman, Richardson, Crutzen & Foley, 2009; Steffen, Richardson, Rockström, Cornell, Fetzer, Bennett, Biggs, Carpenter, de Vries, de Wit, Folke, Gerten, Heinke, Mace, Persson, Ramanathan, Reyers & Sörlin, 2015).

Holden et al. agree that the prevailing concept of sustainable development is too vague and must be given content through research; otherwise, 'the concept will end up as mere rhetoric' that offers little guidance for policymakers and scientists (2013:67). They agree with Dahl (2012) that targets are important but are critical of the SDGs for offering too many goals and indicators, which makes it very difficult to measure progress in practice and also allows for 'cherry-picking' – countries choosing which ones to address and report on rather than addressing their challenges holistically. They also agree with those critics who are concerned that many of the SDGs appear redundant. No person would argue against poverty alleviation and eliminating hunger, SDGs one and two respectively. Furthermore, no distinction is made between primary and secondary goals, rendering the SDGs effectively directionless. *Our Common Futures* presents sustainable development as a win-win-win approach whereby the economy, society and the environment can all perform better collectively, without the need for trade-offs or limits being imposed. Holden et al. (2018) criticise this on the grounds that wealthy societies must change, which is more



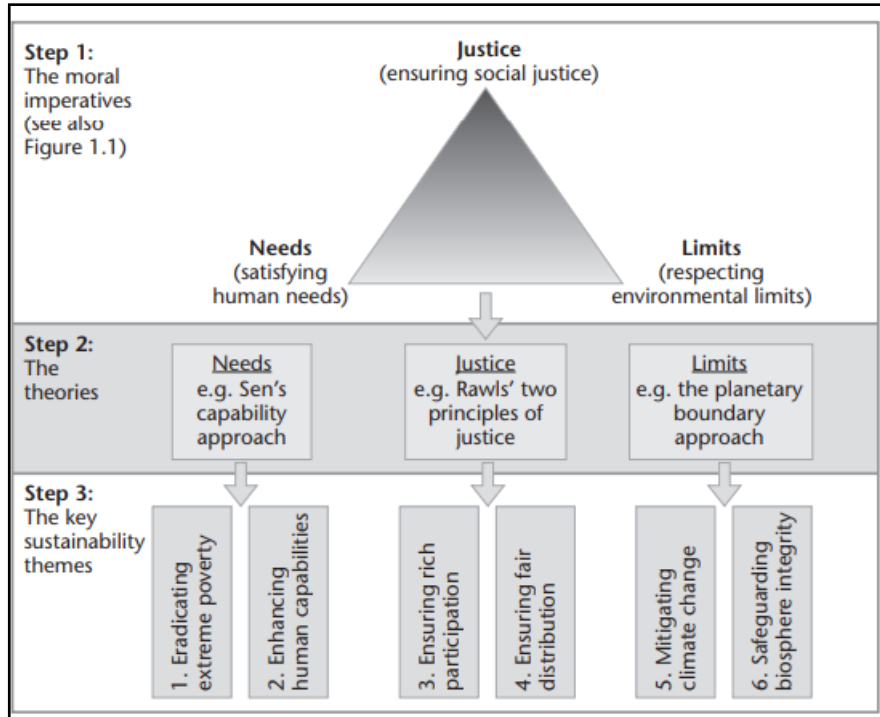
than simply letting go of certain luxuries, and rather calls for shifting to a lifestyle that is attuned to the ecosystem of the planet. Wealthier societies must change what they consume, the way that they consume and what they produce. Linnerud, Holden & Simonsen (2021) state that this also includes their energy consumption, which must be reduced drastically.

While critical of the SDGs they do not wish to discard the concept of sustainable development itself, which has significant traction in global policy agendas and should therefore not be jettisoned but reinvigorated. In their earlier work, Holden & Linnerud (2007:175) proposed three goals for a sustainable development trajectory: '(1) safeguarding long-term ecological sustainability, (2) satisfying basic human needs, and (3) promoting inter- and intra-generational equity'. Subsequently they refined this to define what they described as 'the sustainable development space' in terms of three objectives: equity (ensuring social equity); needs (satisfying basic human needs) and limits (respecting environmental limits) (Holden et al., 2016). Building on Amartya Sen's (1993; 2009) emphasis on human rights as an ethical concept they thus envision 'sustainable development' as an ethical commitment that shapes how we *should* live. In this conception equity, needs and limits become three 'moral imperatives' which are all equally important and have to be met in tandem with each other (Holden et al., 2018).

They argue that prevailing models of sustainable development fail to place any urgency on the issues at hand, whereas a model based on moral imperatives indicates that there are no alternatives: what should be done to secure global welfare is our duty. These imperatives recognise that there are constraints that need to be imposed on human behaviour, i.e., they operate with the understanding that there are thresholds that cannot be crossed if development is to be truly sustainable. Of the three imperatives, it is the need to respect environmental limits that is most often traversed, as it is seen as a less immediate concern compared to social equity and satisfying human needs.

The three moral imperatives are underpinned in turn at the theoretical level by understandings of justice, needs and limits which are expanded upon below. These then inform the development of 'key themes, headline indicators, and thresholds' which should guide policymakers' decision-making in particular contexts (Holden et al., 2018). Their model for how to think about sustainable development is shown in Figure 3.3 below.

Figure 3.3 Holden et al.'s (2018) model for sustainable development



Source: Holden et al. (2018:120)

### *Satisfying human needs*

According to Holden et al. (2018:115), satisfying human needs must go beyond simple survival or providing only the most basic needs for human development, such as the physiological needs at the bottom of Maslow's (1943) hierarchy that are recognised as fundamental for survival: food, water, air, sleep, and shelter. To this list I would add energy as an essential need. In my case study site of Kareeville, household's basic energy needs are often not met. The energy sources they can afford often fall short of what is needed to provide adequate levels of nutrition, cleanliness and warmth while also failing to support additional activities, such as lighting for children's schoolwork or safety, which could improve the quality of life of households and members' future opportunities. Zepeda and Zepeda (2017) have argued along similar lines and also extended the responsibility to provide energy as a basic human right to the state. Löfquist (2020) also argues for the recognition of energy as an essential need, access to which allows individuals to decide on the life they choose to lead. At the same time, Frigo, Baumann & Hillerbrand (2021) argue that access to sufficient energy should be seen as a human right inasmuch as the capability to consume energy extends beyond simply meeting the basic needs of survival and encompasses the individual's right to, in Robeyns' words 'be whom they want to be'.

As this last point indicates, while basic needs must be met, they are not a sufficient measure of sustainable development on their own. Here Holden et al. turn to Amartya Sen's capability approach which has dominated the literature on the theoretical and philosophical foundations for human development. The capability approach focuses on people's capabilities, i.e., what they can do and thereby become. Sen's (2009) approach acknowledges that people do not only seek to survive but also have valid aspirations for an improved quality of life and to live a life that they experience as meaningful and valuable. The capability approach, therefore, seeks to measure a person's quality of life by the capabilities they have with which to achieve their aspirations.

This approach therefore moves away from conventional measures of individual well-being such as the resource-based approach, the basic-needs approach or the utility-based approach and argues, rather, for people's 'effective opportunities to undertake the actions and activities that they want to engage in, and be whom they want to be', although not without some social constraints (Robeyns, 2005:95). Sen (1987a) does, however, distinguish between various capabilities and acknowledges that some are more basic than others for escaping poverty or avoiding absolute deprivation. These basic capabilities then form the building blocks with which more advanced capabilities can be met. As noted by Pellicer-Sifres, Simcock & Boni (2021:1028), 'Poverty and suffering are conceptualised as situations of capability deprivation, a situation in which a person lacks the capability to achieve certain critically valuable functioning'. Sen (1993) therefore notes that a capability is not an achievement, an end-state in itself, but, rather, a pathway allowing individuals the freedom to reach what they perceive as an achievement, a goal or a desire.

Holden et al. (2018:116) use this distinction to argue that the moral imperative of satisfying human needs must therefore be a two-stage process. Firstly, a person's basic capabilities must be met, i.e., they must have the opportunity to escape poverty and deprivation. The commitment to sustainable development cannot rest there, however, and secondly, people must be provided with the capabilities to further their development and be able to live the life that they value. This could require investment in education, health, cultural or other spheres of human activity. The key themes for this imperative then, are eradicating extreme poverty and enhancing human capabilities.

*Ensuring social justice*

Holden et al.'s (2018) understanding of the moral imperative of ensuring social justice rests on the work of American philosopher John Rawls. Rawls maintains that while one person can be born into a higher social standing than another, these differences are neither fair nor unfair. They are merely facts of life. However, the way that institutions and the state deal with these facts are what makes them just or unjust (Holden et al, 2018:58). Equal citizenship is, therefore, non-negotiable and a prerequisite for a just society. Perhaps the most significant point of Rawls' (1999) argument in the context of South African debates on the 'just transition' to renewable energy is that something cannot be just if it denies one group an advantage simply to provide a greater good for all. A related argument has been made by Spalding-Fecher, Williams, and van Horen (2000:12):

What does it matter if the country generates its electricity from more benign, renewable sources of energy if millions of people cannot use that electricity in their homes and, instead, face the hazards of using coal, candles, paraffin, and wood daily?

Renewable energy is often framed as benefiting all by reducing the country's carbon emissions. Yet, as will be shown in chapters six and seven, Kareeville residents cannot afford adequate supplies of energy to meet their household needs, despite the massive investment in solar and wind farms in their backyard.

For Holden et al. (2018:117), the moral imperative of social justice rests on two key sustainability themes: ensuring rich participation and ensuring fair distribution. I work with both themes with regard to my research site in chapters six to nine. As already suggested in my discussion of my research methodology, 'rich participation' has been severely lacking in the REIPPPP programme. The local municipality had little to no knowledge of the REIPPPP bids in their municipality until they were at the construction stage. De Aar residents have also not been consulted regarding the implementation of the REIPPPP and potential job opportunities, nor have they received information relating to the SED and ED practices of the three IPPs operating around their town.

The emphasis on 'rich participation;' and 'fair distribution' can be linked to the substantial body of literature on energy justice (McCauley, Heffron, Stephan & Jenkins, 2013; Sovacool & Dworkin, 2015; Jenkins, McCauley, Heffron, Stephan & Rehner, 2016; Bouzarovski & Simcock, 2017) and energy democracy (Szulecki, 2018; van Veelen & van

der Horst, 2018). This literature is concerned with analysing issues related to decision-making in the energy sector as well as concerns around access, the allocation of energy services and 'accountability of energy-decisions across time and space' (Siciliano, Wallbott, Urban, Dang & Lederer, 2021:1051). These are important concerns which I regard as aligned with the understanding of needs and social justice in the concept of sustainable development as defined by Holden et al. (2018). What their understanding of sustainable development also does is ensure that commitments to justice and democracy in the energy field are tied to the moral imperative of respecting environmental limits.

### *Respecting environmental limits*

Holden et al. (2018) base the third moral imperative, respecting environmental limits, on the planetary boundaries approach put forward by Rockström et al. (2009) and Steffen et al. (2015). They regard this approach as particularly useful in practice as it identifies quantifiable environmental limits at the global scale. This approach has been championed by researchers at the Tällberg Foundation, the Stockholm Environment Institute, and the Stockholm Resilience Centre. It identifies nine boundaries which these researchers have categorised as marking out 'a safe operating space for humanity concerning Earth's system' (Holden et al., 2018:118). According to Steffen et al. (2015:736), two of the nine boundaries, those of climate change and biosphere integrity, must be regarded as 'core boundaries.' If either is pushed beyond a certain threshold, the Earth's system is tipped into a new state (Steffen et al., 2015:737).

Holden et al. (2018:119) have therefore singled out these two boundaries as the key themes for this third moral imperative. Here one of the major concerns for environmental policy and decision-making is that both mitigating climate change and ensuring biosphere integrity are filled with uncertainty. Decision-makers are unable to describe all possible outcomes of the decisions they take and often have no or little experience in making these types of decisions. To illustrate this challenge, Holden et al. (2018) use the example of the decision-making needed for deciding how to save an entire rainforest from extinction. They therefore argue that the principle that has to apply is what can be termed the 'safe minimum standard of conservation' (Holden et al., 2018;119). This encompasses rejecting all proposals of projects and decisions which involve the risk (not necessarily the certainty) of species extinction.

Holden et al.'s three-dimensional model of what the sustainable development space entails is based on four inter-related premises. First, the three moral imperative spheres are non-negotiable. There cannot be a hierarchy in which, for instance, achieving social justice receives more attention than respecting environmental limits. Second, sustainable development must be a globally desirable goal – different nations cannot emphasise one imperative over another, given their own assessment of their development needs. Third, the model does not reject economic development per se. Rather, Holden et al. argue that economic growth is neither inherently sustainable nor inherently unsustainable. In some contexts, economic growth may contribute to an increase in wellbeing, address poverty and provide upliftment to poorer households and therefore satisfy needs and address social justice (Holden et al, 2016; 2018). However economic growth may also involve the unsustainable exploitation of natural resources. For economic activities to be sustainable, they must therefore be constrained by the three imperatives represented in the model. Fourth, they argue that democratic participation is paramount for the success of their model. They caution that while sustainable development may appear achievable utilising a top-down approach 'effective citizen participation in decision-making' is required (Holden et al., 2016).

At the same time, Holden et al. caution against pitting the top-down and bottom-up approaches against each other. The top-down approach implies that development indicators are implemented either by national governments or groups of scientific experts. This approach is often viewed as authoritarian as the indicators are enforced by those with power in society. The bottom-up approach is therefore seen as the more democratic approach, in which the indicators of sustainable development come from local communities or organizations in discussion with various actors. However, Holden et al. (2018:109) warn that a bottom-up approach might not always be the most appropriate route to follow for setting long-term global commitments to sustainable development, as this approach can fall into the trap of focusing on the *here* and *now* concerns of local communities, at the expense of more long-term concerns for society more broadly. This recognition introduces tensions into policymaking which can be difficult to negotiate, as seen in the debate on the 'just transition' in South Africa. Here, the value of international commitments can be seen, as they demand wider accountability from countries around their undertakings.

For me a key point is that Holden et al. (2018) have designed their model as a guide to help shift us away from an unsustainable state. For them sustainable development is a process for which their model offers a set of broad guiding principles, not a blueprint:

This space, which we call the sustainable development space, contains many potential end-states. The space is, however, constrained by thresholds that cannot be overstepped. Achieving sustainable development means that we are entering that space (Holden et al., 2018:215).

The final destination cannot therefore be fixed from the start, nor can the same targets and indicators be set for all parts of the world. They need to be context specific. Here, a further challenge is to determine the scale at which particular policy decisions must be made in relation to the three imperatives of sustainable development. Addressing climate emissions and targets to reduce carbon emissions is a global concern that also has major national and local implications but the way in which national policies are developed around this has to take the local context into account.

Renewable energy is a useful sector through which to think through the complexity of the considerations at stake. Although it is widely seen as an essential contribution towards sustainable development globally because it helps reduce carbon emissions, actual renewable energy plants do not necessarily respect the environment at the local or regional level. The materials used in constructing wind turbines and solar panels include rare earths that can be mined in environmentally and socially very unsustainable ways. Transporting components can also involve energy-inefficient trucks traveling long distances while, a central concern of this dissertation, local people may not benefit from the 'clean' electricity that is produced. At the same time, a renewable energy dispensation that supplies households with clean, affordable energy in sufficient amounts to support their daily needs could be a prime example of a sustainable development practice that satisfies human needs and advances social justice. These considerations raise questions about the scale at which the trade-offs are measured and applied and who is empowered to make these decisions. Scale as a lens through which to look at not only sustainable development but also energy poverty is discussed in the next section.

## 3.2 Scale

Bouzarovski & Simcock (2017:642) make the critical point that 'Justice ...defined at one scale does not necessarily mean justice is achieved elsewhere.' As the previous discussion has shown, the scale at which commitments to sustainable development are applied is important and the considerations that apply at different scales are complex. Defining the planetary thresholds that should not be breached in international agreements around transitioning to a low-carbon economy is a different exercise from that involved in translating these commitments into national policies that are attuned to local environmental thresholds and social needs that are not everywhere the same. In the following discussion I briefly unpack my understanding of scale and then turn to the relevance of scale for developing energy policy.

### 3.2.1 Defining 'scale'

According to Harrison (2010:2), 'scales are not "out there" waiting to be used but must be brought into being and given meaning'. He provides the example of a 'national scale' and a 'regional scale' as referring to economic and politically constructed definitions and boundaries. At the same time, the local is also not the only de facto scale to consider when researching developments on the ground. As Walker & Chinigò (2018) have argued with regard to the internationally networked Square Kilometre Array astronomy installation that is being built in the Northern Cape Karoo, the local, national and global intersect in complex ways in this project. In similar vein Delaney & Leitner (1997) argued that the concept of scale does not involve a linear movement from the smallest (individual) to the largest (global) and often the issue under investigation presents itself over multiple scales. My study is focused on households in a particular local municipality but understanding what is happening at this level involves recognising institutions and developments that involve other scales.

My understanding of scale is informed by Delaney & Leitner (1997) and Gibson, Ostrom & Ahn (2000). According to Gibson et al. (2000:219), scale refers to 'the spatial, temporal, quantitative, or analytical dimension used by scientists to measure and study objects and processes'. According to them scale necessarily encompasses a relationship, which in some but not all instances may be hierarchical (for instance national versus local government). The question of the scale at which decisions related to developments are



made and at which level they are applied is useful for inquiring into sustainable development.

In the next section I develop the application of scale to energy policy.

### 3.2.2 Scale and energy policy

Researchers such as Bouzarovski & Simcock (2017); Sareen, Thomson, Herrero, Gouveia, Lippert & Lis (2020); Caprotti, Essex, Phillips, de Groot and Baker (2020) and Simcock, Frankowski and Bouzarovski (2021) have all argued that scale is an important lens through which to interpret and analyse energy policy and energy poverty. Energy is generated, distributed, and consumed across multiple scales. This can be illustrated with reference to South Africa's energy system which Caprotti (2020) has described as complex. While a state-owned entity, Eskom, oversees electricity generation, transmission, and distribution; the local distribution and maintenance of electricity infrastructure falls squarely on the shoulders of local municipalities. At the same time Eskom is dependent on investment funding, infrastructure components and expertise, the sources of which extend beyond the borders of South Africa. The national government has adopted several climate-action policy documents (described in the next chapter) and acknowledged its global responsibilities to reducing its carbon emissions through the signing of the Kyoto Protocol (in 2002) and the Paris Agreement (in 2016). The climate mitigation commitments of the state also cascade downwards to become the responsibility of local government, although according to the Emthanjeni Local Municipality (2021:28), they do not have the capacity nor funds available to enforce a climate action plan and have thus abandoned any climate mitigation strategies. Meanwhile the renewable energy projects in the municipality are answerable to national plans while local households in the municipality are struggling to buy electricity off the national grid.

Understanding the introduction of renewable energy into this mix thus benefits from adopting a multi-scalar lens. Goldthau & Sovacool (2012) have argued that energy is not simply a sector or policy field, but a concept embedded in complex systems spanning across vertical and horizontal scales. Goldthau (2014) provides an example of this by noting how the production of the physical infrastructure of renewable energy as well as the environmental and social impacts of this infrastructure span multiple scales. She describes how the impact of wind turbines; electricity substations and transmission lines are not restricted to their immediate locality:

Cost arising from allegedly spoilt natural landscapes, potential pollution or noise emission are local, often triggering local “Not in my Backyard” (NIMBY) effects. At the same time, energy infrastructure is barely restricted to the local level. To the contrary, it typically spans municipal and provincial boundaries and easily also transcends national jurisdictions (2014:136).

Kirshner, Baker, Smith, & Bulkley (2019:122) point towards a disjuncture around the distribution of the benefits of energy policy at the national and the local scale. They use the example of South Africa's REIPPP programme which, they argue, privileges large international companies over South African businesses.

The multiscalar nature of the energy sector makes for a complicated regulatory environment (Goldthau and Sovacool, 2012:232). With regards to renewable energy, Lochner et al. (2017) maintain that the SED and ED programmes required under South Africa's REIPPPP can only benefit the surrounding communities if the IPPs engage with local government. They do, however, caution that this is a tightrope for the IPPs to walk, as the marginalised local government authorities often cannot engage effectively with the IPPs. This can then result in the IPPs funding programmes that do not benefit the local community. Their concerns around the lack of engagement of local municipalities are valid, although they appear to assume that local government will necessarily represent the views of local residents. In Chapter Eight I give the example of a solar company providing funds to a project that they thought would be to the benefit of the local municipality. However, they were actually funding an entrepreneur from Cape Town who was interested in establishing a business in the town.

While policy is introduced at the national and regional level, the benefits do not necessarily reach the local and household level. Bouzarovski & Simcock (2017) argued that energy policies must be localised and specific to the needs of the people they are targeting. According to a 2006 study by Davidson, Kenny, Prasad, Nkomo, Sparks, Howells, Alfstad & Winkler titled *Energy policies for sustainable development in South Africa*, the household is an important level that energy policy needs to target through the development of not only appropriate but also affordable services:

The residential sector is of key importance for social sustainability. A sustainable development approach would mean delivering services that meet basic human

needs, but in a cleaner and more efficient manner... Access to energy in physical terms needs to be accompanied by affordability in economic terms (Davidson et al., 2006:189).

What they were arguing before South Africa's energy crisis had really come to the fore was that putting households at the core of energy policy in South Africa had the potential to advance sustainable development by addressing matters of human needs linked to social justice.

Scale is therefore a useful concept with which to make sense of the complex relationships among the various actors in my study and think about the contribution of renewable energy to sustainable development at different scales. It encourages a critical awareness of the different constituencies to which the participants in my study site answer and what this means for development policies and priorities on the ground.

### **3.3 Energy poverty**

#### 3.3.1 Defining energy poverty

Bouzarovski (2018:12) notes that research on energy poverty in the 1990s focused on expanding the electricity grid and finding solutions to connect rural households. Globally, 'more than 2.7 billion people lack safe cooking facilities, and 1.2 billion people do not have access to electricity, the majority of which reside in sub-Saharan Africa or developing regions in Asia' (Van Niekerk & Kimemia, 2017a:289). In recognition of these concerns, the UN (2018:3) has defined energy poverty as follows: '(a) lack of access to electricity networks or (b) dependence on burning solid biomass, such as wood, straw, and dung, in inefficient and polluting stoves to meet household energy needs'. Kohler, Rhodes and Vermaak (2009) also define energy poverty, also conceptualised as energy deprivation (Bouzarovski, 2004), narrowly, as lacking access to what are described as 'modern fuel sources which are deemed necessary for human development'. Modern fuel sources are understood to include electricity as well as gas for cooking and heating but to exclude firewood, candles and paraffin which thus become stigmatised as 'inferior' and 'primitive' (van der Kroon, Brouwer & van Beukering, 2013; Francioli, 2018).

However, as has been argued by Krupa & Bursch (2011: 6255), the lack of an electricity connection does not necessarily indicate that a household is 'poor'. In keeping with Holden et al.'s definition of sustainable development discussed above, 'traditional' fuels such as wood could be both affordable and sustainable, depending on the local environment and how the supply is grown, costed, and managed. At the same time, as my study shows, mere access to electricity networks does not equate with being able to afford the electricity that is available via the grid. The understanding of energy poverty therefore needs to extend beyond mere access to infrastructure and, as a starting point, incorporate the affordability of the energy sources that are required to meet basic needs in households as the first stage in enhancing human capabilities as understood by Sen. Also drawing on Sen's capabilities approach, Bouzarovski (2004; 2015) notes that an individual's energy needs are linked to their everyday functioning's and what they deem as important for their own well-being.

Thus, the objective for all households everywhere to switch to electricity should not necessarily be the policy goal. Rather, what is important in defining energy poverty is the ability of households to consume fuel sustainably and at a level that enhances social wellbeing and meets basic needs. Thus, my understanding of energy does not demonise traditional fuel sources such as firewood, candles and paraffin but, rather, investigates the consumption of such resources through a sustainable development lens. In the context of De Aar, however, a semi-arid Karoo town, electricity is the default fuel, so its availability, affordability and sustainability are key considerations.

Ismail & Khembo (2015) have summarised three of the most popular approaches to measuring energy poverty; they are as follows:

- *The expenditure approach*: This is by far the most popular approach (Ismail & Khembo, 2015:68). It divides households into categories according to certain thresholds, below which they are considered energy poor. Households are considered energy-poor if they have to choose between spending income on energy or other basic goods. According to Thema and Vondung (2020:3), this approach's validity is questionable as the motives for spending less on energy resources may not always correlate with being energy poor but might rather indicate energy efficiency.

- *The objective approach*: This approach is placed here as a subsidiary to the expenditure approach. This approach works with the percentage of household income that is spent on energy sources; according to Waddams, Brazier, Pham, Mathieu, & Wang (2006), a household that spends more than 10% of its accumulated income on energy needs can be considered energy-poor.
- *The self-reported approach*: This approach uses households' own perceptions of whether they are 'poor' in terms of their access to the energy they need.
- *The access-adjusted approach*: This approach measures the accessibility of the energy sources which are available to households within their locality (Kohler et al. 2019).

Simcock, Frankowski & Bouzarovski (2021) and Bouzarovski and Petrova (2015) argue that energy poverty is not simply a 'financial issue' in which the concept can be simplistically applied to households that do not have enough money to purchase a certain quota of energy resources. Rather, the complexity of the energy needs of people is not recognised politically and therefore these needs are misrepresented in energy policy. In similar vein, Walker & Day (2012) have argued that the energy needs of vulnerable people such as children, the elderly and people living with disabilities and illnesses are especially likely to be ignored. According to Simcock et al (2021), energy poverty is often framed by governments as an individual failing, with individuals blamed for mismanaging funds, using energy unwisely or wasting it by leaving appliances on when not in use or by not purchasing energy-saving appliances. (The topic of energy appliances appeared as a theme throughout my interviews in Kareeville and is discussed in Chapter Six, section 6.3.2.)

While I agree that income poverty is not the only consideration, what my study shows is that lack of money is a major reason why people whose houses are connected to the national grid in De Aar do not have enough electricity to meet all their household needs over the course of a month. At the same time, consistent with Sen's capability approach, energy poverty is a condition that cannot be quantified based on numerical data alone. Nor is it a static state. According to Pellicer-Sifres, Simcock & Boni (2021:1038), 'conceptualising energy poverty, and the harms it causes, as a moral issue reminds us

that its alleviation is not simply an optional act of charity or benevolence, but a fundamental obligation of government'. They argue that framing energy poverty as an injustice puts demands on governments and policymakers to take action to address the injustices committed against those households. They therefore propose energy as a fundamental right to all households.

### 3.3.2 Household energy poverty in South Africa

In South Africa the Department of Energy (2013: viii) identified the expenditure approach as the one it favours for measuring energy poverty. What makes this approach attractive for policy makers is that researchers and governments do not have to identify the actual amount of energy being consumed by households, nor the size of households. They can also rely on large surveys to gather data on average energy consumption. Using this approach, Van Niekerk & Kimemia calculated that in 2012, 47% of South Africa's population experienced energy poverty (2017a:289). However, what this approach may miss is the extent to which poor households stay above the predefined energy expenditure threshold by going without energy when their funds are depleted for the month or payment period. The critique of the expenditure approach is that it often skews the data and misrepresents what is happening within households (Thomson, Bouzarovski & Snell, 2017).

Anton Eberhard & Clive Van Horen's book (1995), *Poverty and Power: Energy and the South African State*, examined inequalities in South Africa at the time of the country's transition to democracy by viewing the household energy sector. Through empirical analysis, they identified seven themes that, they argued, characterised South Africa's household energy sector and impacted on supply and demand at the time. These seven themes were as follows:

1. 'Household access to electricity is highly skewed;
2. Multiple fuel use is the norm rather than the exception;
3. Geographical factors have an important influence on energy consumption;
4. Energy constitutes an important item in household budgets;
5. Energy transition theory cannot adequately account for real decision-making processes in households;
6. Energy poverty has environmental, health, and social costs which are of national significance; and

7. A supply-driven household energy policy will not produce the optimal result' (Eberhard & van Horen, 1995: 44)

While written in 1995, the themes remain useful in my analysis of household electricity needs and usage. In South Africa, as in other countries, poor households spend far more of their household income in relative terms on securing energy than wealthier households. In 2005 a study by Sugrue (2005:4) found that affluent households spend between 2 to 3% of their income on energy compared to the average poor household which they calculated to be spending approximately 25% of their total household income on energy expenditure. The Cures report of 2009 presented somewhat different numbers but made the same point; according to them poor households were then spending between 12 and 20% of their income on energy fuels (2009:3).

According to a 2009 study of energy poverty by Kohler, Vermaak & Rhodes (2013), energy poverty amongst households was highest in the Limpopo province (at 66%), followed by the Northern Cape Province (at 53%). The lowest levels of household energy poverty were found in the Western Cape (20%) and Gauteng (21%). In 2012, the *National Development Plan*, South Africa's roadmap for development policy and planning to the year 2030, noted that 'the energy needs of poor households [were] still inadequately met':

Between a fifth and a quarter of South Africans still have no access to the grid. The electrification programme has slowed (annual connection rates are now half of those a decade ago) and the original goal of universal access by 2014 is not feasible...Even poor households with access to electricity can afford to use only modest amounts and rely on other sources such as paraffin, gas, and fuel wood (National Planning Commission, 2012:171),

To combat energy poverty, the NDP (2012:171) suggested a new target for grid connections: to connect at least 90% of South African households to the grid by the year 2030. The NDP also suggested off-grid solutions for isolated rural areas where grid connections would not be possible, including 'sustainable production of fuel wood' and the use of combustion stoves. It must be noted that already in 2007, the Department of Minerals and Energy (2007, Government Gazette No.29760) enacted the Free Basic Alternative Energy Policy (FBAE). The FBAE focuses solely on indigent households where no grid electricity is available nor are there any immediate plans to electrify the area. Municipalities therefore finance and provide these homes with alternative fuel sources

such as Paraffin, Liquid Petroleum Gas (LPG), Coal and Bio-Ethanol gel.<sup>15</sup> In both the NDP and the FBAE, there was thus an implicit recognition that being connected to the national grid is not the only way to deal with energy poverty.

Rising electricity tariffs add to the growing burden on poor households as each upward adjustment means that less money can be spent on purchasing other household essentials. Poor households can also not afford energy-saving appliances. In this context low-income households do not have the luxury of deciding what food they would like to cook and consume. The choice of food is dependent not only on the affordability of the food but also on the availability and affordability of the fuel required to prepare it (Balmer, 2007:6). It is therefore not surprising that my research in Kareeville found that the type of fuel available to a household at a given point in the month also dictated the type and amount of food that the household would consume. According to a study conducted in 2004 by Cowan and Mohlakoana on energy poverty in Khayelitsha, Cape Town, residents employed a range of strategies to make the most out of their available electricity, such as reducing their cooking to only once a day and cooking different foods within a single pot.

In South Africa, despite the ubiquity of electricity, multiple fuel use remains the norm as households make use of a variety of fuel types to meet their basic energy needs (Aitken, 2007; Ateba, Prinsloo & Fourie, 2018; Sole & Wagner, 2018; Uhunamure, Nethengwe & Musyoki, 2017; Mutumbi, Thondhlana & Ruwanza, 2021). Bouzarovski (2015:16) notes that different energy fuels can be used in order to meet various energy needs, he provides the example of wood as a fuel source stating that it can be burnt to provide heat, it can heat water and provide light all at the same time.

Eberhard & van Horen's (1995:44) seventh bullet point is related to this: a supply-driven household energy policy simplifies the complexity of household energy usage and in attempting to provide solutions through a top-down approach misses the mark. The national electrification programme exemplifies this approach: it is a supply-driven energy policy which has attempted to rectify historical inequalities around household electrification without understanding the nature of household energy regimes. The solution was conceptualised as simply providing all households with access to the national grid. A related expectation of the programme was that households would then forego previously

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<sup>15</sup> Bio-ethanol gel is ethanol extracted from agricultural products such as sugar cane.



used alternative fuels (such as paraffin, wood and gas) in favour of electricity, with accompanying benefits in terms of human health and fire reduction.

Historically, the distribution of electrical services and access to electricity in South Africa has mirrored the racially defined political and economic inequalities in South Africa (Phillips & Petrova, 2021). According to Kirshner et al. (2019:123), supplying households with grid electricity has been deemed a form of emancipation from the previous apartheid regime, with off-grid connections considered by low-income energy users to be 'symbolically inferior'. The cultural aspects of energy use must therefore also be considered in developing and communicating energy policy and rolling out the provision of new forms of access and/or supply.

Energy poverty also contributes directly to death and disease (Spalding-Fecher, et al. 2000; van Niekerk, Kimemia, Seedat & Annegarn, 2022). Poor people's reliance on paraffin, gas, wood, candles, and coal to meet their energy needs causes not only environmental problems but also serious health issues. Globally indoor household pollution is estimated to account for some 4 million deaths every year while burn-related injuries account for more than 265 000 deaths, of which 100 000 deaths are of children (Kimenia & van Niekerk, 2017a:289).

Research on the environmental influences on energy consumption indicates the importance of factors such as weather, changing climatic conditions, proximity to fuelwood and resources and the rural-urban divide (Lawson & Nguyen-Van, 2021; Ding, Qu, Niu, Liang, Qiang & Hong, 2016; Li, Sun & Dai; 2016; Klimenko, 2012). In De Aar my informants pointed to an increased need for energy for heating houses and preparing hot meals during the winter season when night-time temperatures can drop below freezing and snow is not unheard of. (See figure 3.4 below.) (On climatic fuel usage and fuel selection see: Nkosi, Burger, Matandirotya, Pauw & Piketh, 2021).

Figure 3.4 Snow on the solar panels from one of the IPP's in De Aar, 2018



Source: Submitted to Snow Report SA by Husain Ahmed Haspatel on 8 September 2018

Van Niekerk & Kimemia (2017a:289) have noted that in South Africa energy poverty is a driver of burn-related injuries and deaths. Due to the rapid migration from rural to urban centres, many of the health problems associated with energy poverty are concentrated in informal urban areas. A report by the Fire Protection Association of Southern Africa (2014) found that between 2009 and 2012 more than 5 000 fires were reported in informal settlements. This is also where the health hazards associated with smoke inhalation from indoor wood fires, paraffin ingestion, and candles as fire hazards when knocked over by children are concentrated (Spalding-Fecher & Matibe, 2003; Kimemia & van Niekerk, 2017b; Buthelezi, Kapwata, Wernecke, Webster, Mathee & Wright, 2019; van Niekerk, Kimemia, Seedat & Annegarn, 2022).

In South Africa, 58% of informal settlement fires are caused by paraffin fuels and 30% by candles (Van Niekerk et al., 2022:8). The survivors of burns, paraffin poisoning, and smoke inhalation can suffer long-term psychological, physical, and socio-economic consequences. The dangers are exacerbated by the overcrowded living conditions, the inferior quality of housing and the limited healthcare and support services provided to such communities (van Niekerk et al., 2022:8). Van Niekerk et al. (2022) argue that it is not the nature of the fuel type that is primarily responsible for these disasters. Rather, it is the mismanagement of fuel sources that could potentially explode and cause indoor fires that is to blame, for instance, the failure to maintain equipment such as paraffin stoves properly. The authors also caution that it is not only traditional fuels that are to blame for

burn wounds as electricity is associated with the majority of food and liquid burns that people suffer (2017:290). Emphasis must, therefore, also be placed on raising awareness as well as equipping people with safe technologies.

In addition to the impacts of energy poverty on physical health, Pellicer-Sifres et al. (2021) maintain that energy poverty has a severe impact on people's mental health. Their study of 109 households across four cities in Europe showed how the need to secure energy initiates feelings of anxiety and fear which leaves people distressed.

### 3.3.3 Gender and the management of household energy needs

There has been a growing literature on gender dynamics in the management of household energy needs since the 1980s. (See Annecke 1994, 1996; Makan 1994; James 1999; Mehlwana, 1999; Mehlwana & Qase 1999; Cecelski, 2003; Clancy, Oparaoch & Roehr, 2004). More recently researchers (Goldthau & Sovacool, 2014; Petrova & Simcock, 2021) have argued that the domestic space is an important unit of analysis for unpacking energy use. They further claim that within the home, the experience of energy poverty is gendered, an issue that was an important consideration in my research design.

A quarter of a century ago Hooper et al. (1997) noted that in households the decision-making process around which energy fuel to use, which appliance to use and how much to spend on energy had a strongly gendered dimension. This stems from the role that women play within the household as those primarily responsible for cooking, cleaning, and childcare. Wendy Annecke (2000; 2009; 2010) made similar findings around women's roles with regard to energy usage in poor, rural areas in South Africa. She observed that women were the 'energy managers' in the households as a result of the domestic responsibilities assigned to them as women, 'are responsible for the general well-being of the household, emotionally in terms of nurturing and practically in terms of cooking, cleaning, washing and ironing and the provision of food and clothing -- many of which tasks require energy services for their fulfilment' (Annecke, 2000:45). In 2004 Clancy et al. (2004:3) noted how the study of the gendered dimensions of household energy use was focused on the global south where women and children are burdened physically by the collection of 'traditional' fuels, for example, finding and transporting firewood to cook food and/or secure heat within the home (Cures report, 2003:4). This responsibility was seen to place an additional burden on women as the time they spent foraging for energy resources left them with less time for other activities, including finding employment.

In 1987 the Brundtland Report (1987) reported that 70% of people in what they described as 'developing countries' relied on wood as an energy resource. Deforestation was identified at the time of an issue of concern as forests were being depleted of trees at a much faster rate than new trees were able to grow. However, the authors of the Report (1987) cautioned against putting the blame for this on women who were collecting wood for household use as their impact was tiny and they generally did not cut down whole trees but branches and/or gathered dead branches around the trees. Anneck (2000:46) also argues that women in rural areas have been accused of being responsible for deforestation and adding to emissions through cooking with coal, even though their impact on the environment does not compare with that of industry.

Studies on the gendered dimensions of household energy management have also cautioned against simplistic assumptions about household electricity as a 'time saver' that can free women to lead more 'productive' lives. Various scholars have argued that there is no correlation between household electrification and increased productivity (James, 1997; Palmer Development Group; 1997; Cousins, 1998; Morrissey, 2018). Nor is there a clear correlation between household electrification and increased levels of income. In Morrissey's (2018:10) research report on *Linking Electrification and Productive Use*, in Sub-Saharan Africa (including South Africa), the productive use of electricity was measured in terms of the evidence of an increase in household income or an increase in activities which would allow households to generate savings after the electrification of their houses. According to Morrissey (2018) for household electrification programmes to be successful in boosting they must act as a catalyst for a range of additional services including financial assistance, the provision of business support and access to information and communications technology (2018:6-7).

The relationship between improved access to energy sources and enhanced quality of life for women is in any case not a simple and linear one. In a study by the Palmer Development Group (1997), households in Pniel and Onseepkans in the Northern Cape were provided with solar cookers<sup>16</sup> so that women would no longer have to collect firewood for cooking. The study found that instead of using the 'extra time' they gained by not having

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<sup>16</sup> A solar cooker uses reflective panels to focus sunlight onto a pot in the middle of the cooker. An example of a solar cooker can be seen in Appendix 18

to gather firewood 'productively', on income-generating activities, the women used the time to socialise with their neighbours or other community members instead. One could, however, argue that socialising was still a productive use of the women's time as it helps maintain relationships and build social capital; in terms of the capabilities approach, these women could also be seen to be empowered to make choices about what they valued. Similar findings were reported in a study by James (1995) in Mabibi, a small rural settlement in Kwa-Zulu Natal in South Africa.

Energy policy tends to be gender-blind and not consider the intricacies of daily life (Clancy et al., 2004; Petrova & Simcock 2021). The literature on the gendered dynamics of energy policy and household energy management alerted me to the importance of gender relations in my study site. It informed the analysis of my survey data and also guided my follow-up interviews in Kareeville. It was noteworthy that the majority of the participants in my household survey were women and that it was women who were most knowledgeable about their household's energy needs and energy consumption patterns.

### **3.4 The Minerals-Energy Complex**

The fourth component of my conceptual framework is that of the minerals-energy complex (MEC), a concept which Fine and Rustomjee (1996) developed to theorise South Africa's development trajectory since the mineral discoveries of the second half of the nineteenth century. Applying the lens of sustainable development as understood by Holden et al to the MEC makes it clear that this trajectory placed South Africa on an unsustainable development path when assessed against the three 'moral imperatives' of ensuring social justice, respecting environmental limits and satisfying human needs.

The MEC can be understood as both a descriptive account of how South Africa's industrial development has unfolded and a theoretical framework for understanding the relationship between capital and the state in the exploitation of South Africa's mineral wealth, including its abundant coal resources which have fuelled its electricity dispensation (Jourdan, 1992; Bond, 2002; 2012; McDonald, 2008; 2011; Winkler & Marquand, 2009; Büscher, 2009); Freund, 2010 and Baker, 2015a). Padayachee in Baker, has described these two aspects and their continued relevance thus:

... in descriptive terms [the MEC] refers to an evolving system of production and consumption based on the country's historical dependence on cheap and abundant coal supplies and cheap labour, to produce cheap electricity for an export-oriented industry based on raw and semi-processed mineral products such as coal, platinum, iron ore, steel, and aluminium. Analytically, the MEC offers a framework that can be used to address the economic legacy of apartheid and the nature of power relations, politics and policy-making in contemporary South Africa (2017: 374).

Fine and Rustomjee argued that the history of South Africa's industrial development in the twentieth century 'can in part be understood as the simultaneity of two processes' - on the one hand, 'a shifting and complex short-term resolution of conflicts of capitalists' interests' and on the other, 'a longer-term integration and interpenetration of those capitals as they became increasingly large-scale and diversified.' 'In both processes', they argue, 'the state has played a central, mediating role' (1996:25). One of the consequences of this longer-term process was the uneven development of infrastructure and investment within the country, with this being skewed towards present-day Gauteng and Mpumalanga provinces, while other areas (including the Northern Cape) were neglected (Freund, 2010; Sharife & Bond, 2011).

The availability of cheap labour, via the coercive migrant labour system, coupled with cheap coal and cheap electricity allowed the South African economy to expand at a rapid rate during the 1960s (Fine & Rustomjee, 1996). The mining of coal, gold, diamonds and other minerals underpinned the industrialisation of South Africa and (environmentally damaging) mining has remained central until today. In this process, the two state-owned enterprises of Eskom, established in 1923, and Transnet, originally established as the South African Railway and Harbours Administration (SAR&H) in 1910, have played key roles in shaping the economy. During the apartheid era capital accumulation was further supported by the state through its enforcement of the migrant labour system. The unfolding of the MEC in South Africa's economy through the course of the twentieth century meant that the post-apartheid government inherited an economy built on coal-fired power stations, energy-intensive mining (coal, diamonds, and gold), coal-to-petroleum plants, and an expansive mineral processing sector. It also inherited major social inequalities which demanded reparations as well as a host environmental problem.

Here what is important to note is that the MEC has been a significant contributor to South Africa's GDP and has continued to shape economic development in post-apartheid South Africa (Freund, 2010). Measured by GDP per capita, the more economically developed a country, the greater its per capita energy usage generally is. However, as argued by Eberhard and Van Horen (1995) in the mid-1990s, while more developed countries had decoupled their economic growth from energy expansion, South Africa's economy remained energy-intensive, and the country had not developed energy-efficient technologies as energy remained abundant and cheap. This point is significant for understanding the resistance to shifting away from coal-fired electricity in the early 2000s, that is described in the next chapter.

According to Eberhard and Van Horen (1995:29), the high levels of energy usage in South Africa were attributable to its coal-based energy industries (which have low energy conversion efficiencies compared to oil and gas) and the country's other energy-intensive resource-based industries. In large part because of the way in which the MEC has structured the South African economy over the course of the twentieth century, this analysis is still pertinent today, when the country is grappling with an energy crisis and a national electricity dispensation that is no longer cheap or reliable. Renewable energy can bridge South Africa's need for energy and has become cost-effective however the MEC's trajectory continues to shape the development of renewable energy in the country, as described further in the next chapter.

As noted above, the MEC refers at its simplest to a form of capital accumulation. While some analysts argue that the MEC is less relevant today (see Bell & Farrell, 1997; Baker, 2017; Lochner et al., 2017). Malope (2022) has argued that the REIPPP has been shaped by and remains locked into the MEC that was inherited but also embraced by the post-apartheid state. I concur that the MEC remains relevant today, exemplified by the central role that Eskom, the country's state-owned utility, continues to play and the country's persistent reliance on coal-based electricity generation as well as the commitment of key state players to fossil fuels as critical for South Africa's energy mix (discussed in Chapter Four). The post-apartheid state has acknowledged the need to diversify its energy mix but shifting away from a coal-based economy towards a more sustainable pathway has proved to be difficult. South Africa's energy sector continues to be underpinned by the economy's dependency on low-cost coal to produce electricity that is no longer cheap. Not only the economy in abstract terms but also the lives of the workers

and their communities that are dependent on the coal sector are affected by moves to shift away from this dependence and bring renewable energy into the country's energy mix.

The history of the minerals-energy complex helps explain the dominance of Eskom in the country's post-apartheid energy dispensation, as well as the way the REIPPPP has been structured as a state-controlled programme that feeds into the national grid, with most of the benefits accruing at the national level and not trickling down to the local level. Engaging with the literature on the MEC has helped me understand this unequal development trajectory historically and explain why the small, marginalised Karoo towns that are playing host to these major investments in renewable energy are not in a position to benefit directly from the power being generated on their doorsteps. In this context De Aar is a particularly interesting site for putting into perspective the long-term consequences of the MEC given that, as noted in Chapter One, it was established as a railway town in response to the Kimberley diamond rush.

### **3.5 Conclusion**

Collectively the concepts discussed in this chapter have constituted the conceptual framework that has underpinned my research inquiry, informing both my research methodology and my analysis. My concern with household energy poverty in De Aar, in the context of the major investment in renewable energy taking place around the town, derives from my concern with the potential of the renewable energy sector to contribute to sustainable development in the town, given the history and legacy of coal-fired electricity in South Africa in terms of the minerals-energy complex.

The understanding of the concept of sustainable development proposed by Holden et al. (2016; 2018) provides a valuable set of ideas with which to view the REIPPPP projects in De Aar in terms of their fit with local conditions, their contribution to meeting human needs and advancing social justice in neighbourhoods in De Aar such as Kareeville that urgently need this, and their contribution to addressing environmental concerns around coal-fired electricity nationally and globally. Holden et al. (2016) maintain that there should not be a hierarchy between the three moral imperatives: their insistence that sustainable development requires all three moral imperatives to be met in tandem is critical for adopting a holistic approach to the analysis of the REIPPPP programme. At the same time,



being alert to the multi-scalar operations of the renewable energy sector brings to the fore the challenges of harmonising all three imperatives across different scales. While investment in renewable energy may contribute to reducing global carbon emissions, it does not automatically translate into either environmentally or socially just development at the household level.

The focus of this study is on the local level, including the micro level of the household, in a small town surrounded by renewable energy IPPs. While neither renewable energy as a resource nor the REIPPPP as a programme of government can be expected to solve all the problems of poverty in De Aar, I am arguing that addressing household energy poverty is a neglected aspect in the way in which the REIPPPP has been designed and its SED and ED commitments implemented. Here the significance of the MEC in shaping the conditions in which post-apartheid energy policy has unfolded becomes relevant. This policy framework is the focus of the next chapter.

## Chapter Four: South Africa's energy dispensation: policy frameworks

This chapter reviews the policy frameworks within which South Africa's energy dispensation, development of the REIPPP programme and international commitments to moving towards a low-carbon economy have taken shape. This is the broader context in which the IPPs around De Aar have been operating and household energy poverty in Kareeville need to be understood. It is a complex terrain to cover, and the discussion here necessarily offers only a very broad overview. The discussion is divided into five sections. Section 4.1 provides a very brief background account of the establishment of a national electricity utility for South Africa in 1923. Section 4.2 discusses emerging policy directions in the late 1990s and early 2000s, including the mass electrification programme and development of an indigency policy around 'Free Basic Electricity'. Section 4.3 reviews concurrent policy responses to climate change and the role of the state and state-owned enterprises in actualising these commitments. Section 4.4 looks specifically at the REIPPP programme which came into effect in 2010 to guide South Africa's uneven and contested turn towards renewables. These developments must be understood in relation to the country's electricity supply crisis, linked to growing concerns around state capture and corruption. Finally, section 4.5 addresses the role of local government in the distribution of electricity.

Here it is useful to note the potentially confusing number of name changes that the national department responsible for energy has undergone in post-apartheid South Africa, summarised for convenience in Table 4.1 below. The table also shows the tight bond between mining and energy policy, consistent with the MEC as described in the previous chapter.

Table 4.1: South Africa's energy government department name changes from 1980-2019

Year	Department name
Pre 1994	Department of Mineral and Energy Affairs (DMEA)
1997	Department of Minerals and Energy (DME)
2009	Department of Energy (DoE) Department of Mineral Resources (DMR)
2019	Department of Minerals Resources and Energy (DMRE)

#### 4.1 Background: The establishment of a national electricity utility in 1923

As already discussed in Chapter Three, Fine and Rustomjee (1996) have argued convincingly that Africa's development trajectory since the mining revolution in the late nineteenth century was cemented in a strategy of capital accumulation by the private sector, supported by the state, in which the exploitation of black workers through the migrant labour system was critical.

The mining revolution in South Africa started in 1867, with the discovery of diamonds in Kimberley, in the Northern Cape. This was followed by the discovery of gold in 1886 on the Witwatersrand. The discovery of these two minerals ushered in a period of rapid industrialisation which brought major social and economic changes throughout southern Africa. The passing of various laws by the all-white Parliament after the Union of South Africa was established in 1910 cemented policies aimed at enforcing racial segregation in the interests of the white minority, including the development of a migrant labour system based on unskilled black workers. In this time political and economic power shifted from the Cape to the north-eastern part of the country, centred on Johannesburg.

In the early years of the mining revolution, electricity generation was undertaken by independent power producers that serviced local authorities, with the mining houses often having their own power producers to service their needs. After 1910 the new national government took steps to centralise authority over the railways, with the Natal Government Railway, the Central South African Railway and the Cape Government Railway restructured into a single entity, the South African Railways and Harbours (SAR&H). In

1911 the Mines and Works Act was passed, effectively excluding black workers from skilled positions and confining them to unskilled labour and menial tasks (Clark & Worger, 2011:22). In the same year the Native Labour Regulation Act was passed, cementing the migrant labour system in place (Clark & Worger, 2011). The use of unskilled, migrant workers in the coal-mining sector ensured that electricity generation in South Africa would be cheap throughout the twentieth century (Styan, 2015; Clark & Worger, 2011; Eberhard, 2004).

During the 1920s the notion of a single electricity distribution network, combining all the previous networks into a centralised system, began to take shape in government policy circles (Eberhard, 2004). Abundant, cheap electricity was seen as essential for the development and industrialisation of certain areas, in the interests of 'white' South Africa. In 1922, government passed the Electricity Act from which two state institutions were established: the Electricity Supply Commission (Escom) the forerunner of the national utility company known today as Eskom, and the Electricity Control Board (ECB).<sup>17</sup> Escom was mandated to supply electricity 'efficiently, cheaply and abundantly to government departments, railways, and harbours, local authorities, and industry' (Eskom, 2022). In 1987, the state published two documents: the Eskom Act (Act 40 of 1987) and the Electricity Act (Act 41 of 1987). The Eskom Act changed the name of Escom to Eskom and the Electricity control Board (ECB)'s name changed to the National Energy Regulator (NER).<sup>18</sup> (For more information on the early history of electricity in SA see Clark, 1994; Christie, 1984.)

## **4.2 Energy policy development, 1994 - 2007**

### **4.2.1 The Reconstruction and Development Programme**

In 1994 the African National Congress (ANC) won South Africa's first democratic election. It campaigned on the basis of its 'Reconstruction and Development Programme' (RDP)

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<sup>17</sup> The ECB was responsible for licensing and setting electricity tariffs.

<sup>18</sup> Republic of South Africa.1987. Government Gazette No. 10894

manifesto which set out six principles aimed at addressing the injustices of the apartheid era:

- 1) an integrated and sustainable programme
- 2) a people-driven process
- 3) peace and security for all
- 4) nation-building
- 5) linked reconstruction and development; and
- 6) the democratisation of South Africa (ANC, 1994).

To achieve these goals the RDP sought to centralise the role of the state in addressing basic human needs and unleashing the economic potential of previously suppressed urban and rural areas. However, in 1996 Blumenfeld (1996) criticised the RDP for being too vague in its aims, arguing that the Manifesto was an example of how the ANC in government chose to defer tough decisions around unavoidable trade-offs. While the RDP's targets spoke strongly to popular perceptions about needs and rights, the new ruling party was not creating an enabling environment for addressing them.

The Manifesto offered prescriptive targets and commitments in several sectors, including land redistribution, transport, education, housing, electrification, water supply, health care, and environmental standards. According to the Manifesto, in 1994 a mere 36% of households were electrified nationally, while 19 000 schools and 4 000 clinics had no access to electricity. It must be noted that at this stage Eskom's capacity to supply electricity was not regarded as a challenge as abundant coal-based electricity generation was available. The environmental concerns around how the country's electricity was generated did not feature as a significant concern at this time, outside specialist health and environmentalist circles.

In 1996 the first post-apartheid national census laid bare the disparities concerning basic services and infrastructure in the country. At that stage only 58% of households in South Africa had access to electricity (Statistics South Africa, 1996). As a result of the country's history of apartheid and segregation, the supply of electricity to black African households was limited or non-existent. The state's mass electrification programme after 1994 was thus aimed at addressing past injustices, with the provision of electricity seen as a socio-economic right that was essential for improving the quality of life (Gaunt, 2003:1). The National Electrification Programme (NEP) was launched in 1994 and, as previously noted,

was a major success measured simply in terms of household grid connections. In 1994, Eskom took the responsibility of coordinating, administrating, and implementing electrification in the NEP programme. In 1999, the electrification programme would be shifted away from Eskom and into the office of the Department of Minerals and Energy who took over the administration and funding of the programme<sup>19</sup> (Marquard, Bekker, Eberhard & Gaunt, 2007). In 2002 the programme was relaunched as the Integrated National Electrification programme (INEP). The aim of INEP was to achieve universal electricity access by 2012. Basic access to electricity increased from a mere 31% in 1991 to 88% as of March 2016.<sup>20</sup> Universal access to electricity has not yet been achieved in South Africa.

The 1990s was a period of major policy development with regards to both the energy sector and environmental management. After the first democratic elections in South Africa, the national energy policy was reviewed, leading to the publication of the *White Paper on Energy Policy* in 1998. In this year an important piece of national environmental legislation was also passed, the National Environmental Management Act (NEMA) (Act 107 of 1998). However, although energy policy and environmental policy are clearly intersecting issues, in South Africa they operated largely in isolation from each other in this period. The 1998 *White Paper on Energy Policy* spoke of the need to strike a balance between development goals and the environment (1998:15). While not explicitly stated, it implied that it was the prerogative of the national government to manage the trade-offs and decide when 'development' would have to trump the environment. Rossouw & Wiseman (2004:132) have argued that the environmental legislation passed in this early post-apartheid period did not clearly define who should enforce its provisions for environmental protection. They gave the example of the Department of Minerals and Energy which was mandated to act as both the advocate of mineral extraction and the overseer of provisions intended to limit the environmental impacts of mining.

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<sup>19</sup> Eskom remained responsible for electrification.

<sup>20</sup> Latest statistic as of March 2016 (Department of Energy: <https://www.gov.za/about-government/government-programmes/inep>)

#### 4.2.2 The 1998 *White Paper on Energy Policy*

In the 1988 White Paper, the state identified five primary objectives for South Africa's energy policy:

- Increasing access to affordable energy services
- Improving energy governance
- Stimulating economic development
- Managing energy-related environmental and health impacts
- Securing supply through diversity (DME, 1998).

The 1998 White Paper was concerned not only about the security of the country's energy supply into the future but also the inequalities within the energy sector. It therefore emphasised the need for affordable energy services for all citizens, while enhancing 'the efficiency and competitiveness of South African economy by providing low-cost and high-quality energy inputs to industrial, mining and other sectors'. It also acknowledged the importance of 'achieving environmental sustainability in both the short and long-term usage of our natural resources' (DME, 1998:41-42).

The White Paper noted that the 'negative environmental and health effects of air pollution arising from coal and wood use in households are to blame for environmental degradation (DME, 1998:15) and emphasised that continued efforts around the electrification of households was important for reducing the negative environmental impacts of the use of coal and wood as domestic fuels. It also identified the following fuels as unhealthy: 'paraffin, candles, coal, liquefied petroleum gas, batteries and fuelwood'. (DME, 1998:30) As already discussed in Chapter Three, this is overly simplistic, an example of how national policy development has misread the energy challenges facing poor households, firstly by presenting the electrification of their houses as the solution to their energy poverty and secondly by suggesting that these households would be better off if they refrained from using 'unhealthy' fuels.

Of note, the White Paper also recognised the need for renewable energy in South Africa and thus serves as a marker in the evolution of the government's policies around diversifying the country's energy mix:

... government believes that renewable energy can in many cases provide the least cost energy service, particularly when social and environmental costs are included, and will therefore provide focused support for the development...of renewable energy (DME, 1998:14),

In this regard it mentioned the positive impact of off-grid energy solutions for rural clinics and schools (1998:14). Renewable energy technologies such as solar water geysers and solar cookers could also provide rural and impoverished citizens the opportunity to reduce their household coal and wood usage without being connected to the national electricity grid and could potentially reduce the negative health effects from the air pollution associated with open fires and coal usage within households (DoE, 2015:14). Furthermore, the White Paper stated that a medium-term policy goal was to develop South Africa's productive capacity around renewable sources of energy and noted that South Africa would have to reduce its longstanding reliance on coal as its primary energy source.

However, while the government appeared positive towards the development of both a small-scale and an industrial-scale renewable energy sector in 1998, actual implementation around this issue lagged. Despite its international commitments to reducing carbon emissions (discussed further below) in the late 1990s renewable energy was not taken seriously as a significant component of the country's energy mix. At the time, Eskom was still performing relatively well and the idea of blackouts, loadshedding and load reduction schedules was unimaginable. According to the 1998 White Paper:

South Africa's energy sector is still influenced by international pressures...as the economy opens up to global competition, energy sector policy and investment decisions need to ensure the availability of abundant, easily sourced, and competitively priced oil and nuclear fuel supplies (Department of Minerals and Energy (DME), 1998: 20).

Significantly, however, the White Paper projected that the country's energy demand would exceed the generating capacity by the year 2007 (DME, 1998:41), a warning that was not heeded at the time. The 1998 White Paper also shifted the responsibility for national energy planning that had previously lain with Eskom to the Department of Minerals and Energy.



### 4.2.3 Free Basic Electricity

The state's indigent policy was enacted in 2001. This policy made provision for poor households to receive a subsidy on local municipal services in the form of Free Basic Water, Free Basic Sanitation and Free Basic Refuse Removal (Department of Provincial and Local Government, 2001). In response to rising concerns that the affordability of electricity was also an issue, in April 2003 the government adopted a 'Basic Electricity Support Tariff' policy (Department of Minerals and Energy, *Government Gazette No.25088*, 2003a). This policy made provision for 'free basic electricity' (FBE) for households that met municipal criteria that qualified them as 'indigent' and thus eligible for free basic services. In 2003 the DME decided that qualifying households would be entitled to 50 kilowatt-hours (kWh) per month or a 30-day cycle for free, after which they would have to purchase electricity at the standard rate (DME, 2003a). According to DME (2003a:12), 50kWh was an appropriate amount to ensure poor households could meet their basic energy needs.

Although the DME deemed this allocation sufficient, many analysts argued otherwise, both at the time and subsequently (Gaunt, 2003; Dobbins, 2006; Ruiters, 2009; Dugard, 2009; Adam, 2010; Santu, 2020). According to Dobbins (2006:22), the base study regarding the electricity requirements to sustain the standard of living of poor households was conducted by the University of Cape Town (UCT) in 2002. This study initially projected 350kWh as an appropriate amount for low-income households but their pilot studies indicated that very few households used as much as 100kWh while the majority of households they studied were using 50kWh or less. The government subsequently approved this amount based on this study. However, Dobbins (2006:22) criticised the UCT study for only surveying rural areas and one peri-urban area. The subsidy has been further criticised because the electricity it provides is not actually 'free' – recipients of the subsidy can only access the monthly allocation of 50kWh after they have made a prior purchase of electricity. This, according to Gaunt (2003), was introduced to counter fraud and allow for a more streamlined process to audit vendors that sell electricity. However, as my study shows, the need to pay upfront to access the subsidy can act as a barrier for poor households.

Eskom was also sceptical about the implementation of FBE as it stood to lose revenue as a result. However, according to the DME (2003a), Eskom would only have to fund FBE when it was the direct supplier of electricity. In cases where the local municipality acts as

the distributor, it would be responsible for funding FBE however their funding does come from national government as part of their Local Government Equitable Share (LGES) allocation<sup>21</sup>. In 2007 Marquard et al. (2007:27) estimated the revenue loss due to FBE to be in the region of R600 million per annum, increasing annually by a further R80 million. (This did not include the upfront cost related to the installation of electricity metres.)

In 2010 the NGO Earthlife Africa commissioned a study that showed that 50kWh was not sufficient to meet the growing electricity needs of poor households and proposed a Free Basic Electricity tariff of 200kWh instead (Adam, 2010). This study referred to research by Goyns of Enerkey that examined what 50kWh could be used for in a household. They found that four 60W light bulbs burning for four hours a day for a month would consume 20kWh, an electric stove used for one hour a day for a month would use 42kWh and boiling a kettle for 30 minutes a day for a month would use 21kWh. Thus, using just these three basic appliances extremely frugally would exceed the 50kWh allocated to poor households. A more recent study by Santu (2020) found that '50kWh is equivalent to the energy necessary for basic lighting, small black and white TV, small radio, basic ironing, and basic water boiling through an electric kettle' in a month.

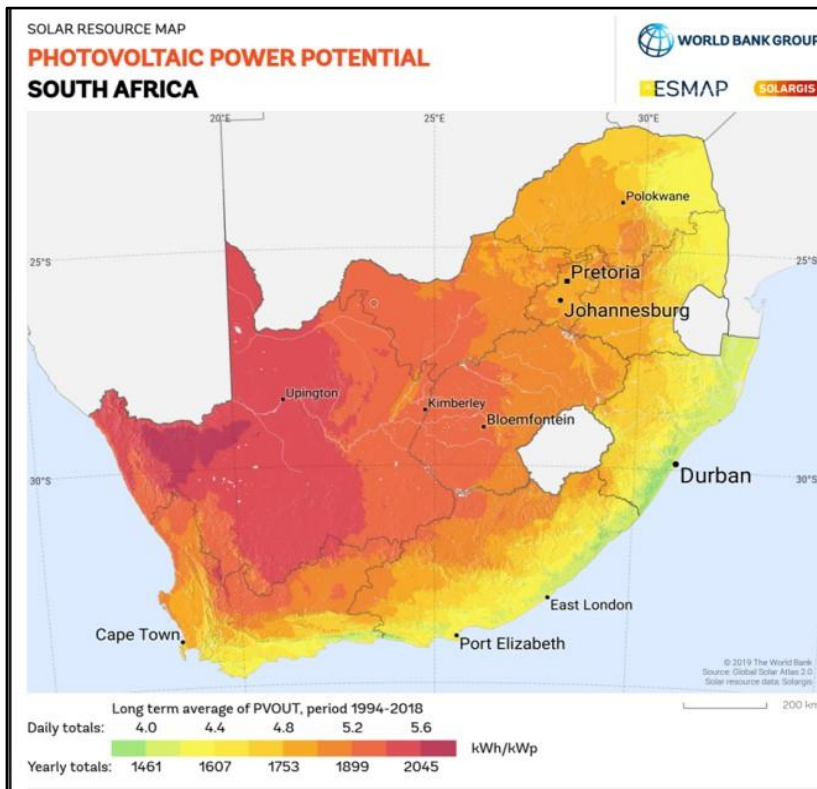
#### 4.2.4 The *White Paper on Renewable Energy* of 2003

*The White Paper on Renewable Energy* of 2003 builds on the acknowledgement in the 1998 White Paper of the potential contribution that renewable energy could make to the country's economy. It was also in line with the international commitments South Africa was making around reducing carbon emissions at this time, in terms of the Kyoto Protocol of 2002 (discussed in section 4.3 below). The White Paper emphasised South Africa's abundant renewable energy resources, both wind and solar. Figure 4.1 below depicts the kilowatt-hour per square metre, expressed as kWh/m<sup>2</sup>, of solar radiation in South Africa. This clearly shows the potential for solar energy in the Northern Cape.

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<sup>21</sup> The LGES is an unconditional grant that can be used by local government to provide basic services to residents.

Figure 4.1: Map depicting the average annual sum of solar radiation per kWh/m<sup>2</sup> in South Africa



Source: Solargis (2020)

In a foreword to the 2003 White Paper the then Minister of Minerals and Energy, Susan Shabangu, pointed to how renewable energy could play a vital role in addressing social issues, especially in rural areas:

it cannot be over-emphasised that South Africa is faced with pressing social problems such as poverty and the HIV/AIDS epidemic. The utilisation of renewable technologies, particularly in remote rural areas...has a potentially important role to play in tackling these important social issues (DME, 2003b: ii).

Invoking the ideas of the 'African Renaissance' as conceived by then President Thabo Mbeki, Shabangu praised the White Paper for contributing to a 'new era of the African Renaissance' and opening up possibilities for a local renewable energy industry.

The 2003 White Paper reiterated the view that renewable off-grid energy technologies could make a significant contribution to improving the quality of life in unelectrified rural

areas (DME 2003b:ii). It also stressed the need for the diversification of the energy sector to secure energy for South Africa and create a competitive renewable energy market in which the private sector could play an important role through what would later come to be known as independent power producers (IPPs) (DME, 2003b: ii). A further important spinoff would be to lower the country's carbon emissions.

#### 4.2.5 Energy demand exceeds supply (2007)

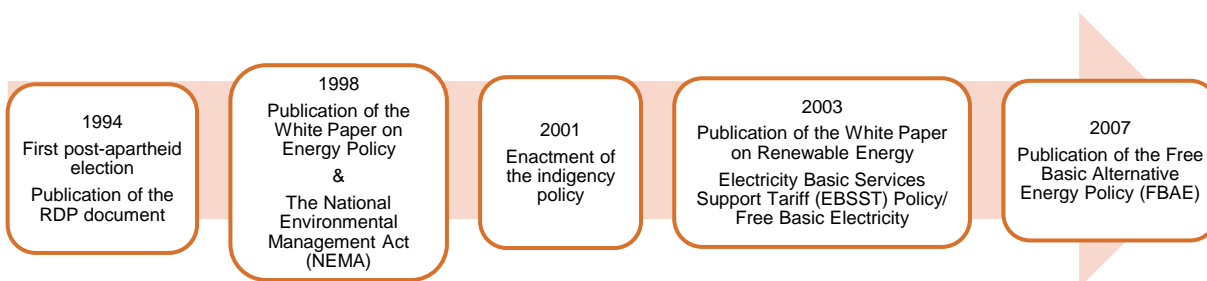
As already mentioned, the 1998 *White Paper on Energy Policy* predicted that the country would require additional energy generation by 2007, by when demand would outweigh supply. However, in 2001 Eskom was barred by government from building new power plants to increase supply, on the grounds that this should be undertaken by private investors (Styan, 2015; Dlamini, 2019). This decision was subsequently reversed in 2004 when South Africa won its bid to host the FIFA soccer world cup in 2010, the first time this event would be hosted on the African continent. The government regarded this as an opportunity to showcase the achievements of the country to the world. Energy security suddenly became a priority, for the first time in the country, and in June 2004 the government approved the plan for Eskom to construct two major new coal-fired power plants: Medupi and Kusile. These two power plants, the first new plants since the construction of the Majuba Power station in 1983, would be built by Eskom instead of an IPP.

Although the decision was taken knowing that the two power plants would not be ready by the time of the World Cup, Malope (2022:108) argues the decision was driven by the Mbeki government's desire to put South Africa on the map and their fear of losing the hosting rights for the World Cup should the country be deemed not to have energy security. However, Medupi and Kusile would prove to bring anything but relief. Mired in a host of corruption scandals, poor design, delays, breakdowns, and protests, neither Medupi nor Kusile were completed on time nor within budget (Yellend, 2021; Styan, 2015; Baker, 2013). Here, the long shadow of the MEC can be seen, as the new governing elite in South Africa has also looked towards state-owned enterprises as sources of enrichment and patronage (Godinho & Hermanus, 2018; Miles, 2018; Bowman, 2020).

In 2007, as correctly predicted by the 1998 White Paper, the country's supply of electricity was unable to meet demand. In November 2007 Eskom was forced to reduce the supply

of power throughout the country and South Africa experienced its first bout of loadshedding. By 2008 'rolling blackouts' and 'loadshedding' were becoming common terms in South Africa. As will be discussed in section 4.4.3, these blackouts continue to this day.

Figure 4.2: Timeline of energy policy developments in South Africa, 1994-2007



### 4.3 South Africa's commitment to lowering carbon emissions, 2002 - 2021

The 1996 Constitution of the Republic of South Africa speaks directly to the country's mandate to secure environmentally sustainable development while at the same time making use of natural resources to promote social and economic development. As stated in section 24 of the Constitution (1996), every person has the right to:

- a) an environment that is not harmful to their health or well-being; and
- b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -
  - i. prevent pollution and ecological degradation.
  - ii. promote conservation; and
  - iii. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

The Constitution thus reflects the language of 'sustainable development' that by the 1990s was increasingly prominent in the discourse of international agencies. This discourse was carried through into the development of post-apartheid environmental and energy policy frameworks. Thus, the National Environmental Management Act of 1998 defined sustainable development as 'the integration of social, economic and environmental factors

into planning, implementation and decision-making to ensure that development serves present and future generations' (Republic of South Africa, 1998:2). However, in practice the commitment was to ensure that environmental considerations should not be allowed to 'trump' economic goals.

In the next section, I briefly outline South Africa's international commitments to climate change mitigation.

#### 4.3.1 The UNFCCC Kyoto Protocol (2002)

In 1992 South Africa was among 130 nations that met in Rio de Janeiro for a UN conference on global environmental issues where Agenda 21 was signed, and the United Nations Framework Convention on Climate Change (UNFCCC) put on the table. South Africa was one of the nations that signed the UNFCCC. This signalled South Africa's support for cleaner energy resources and a cleaner energy future to the international community. The 1998 *White Paper on Energy* was conceptualised in part as a response to the growing global concern around climate change.

However, as already noted, the environmental concerns raised in the 1998 White Paper were not place squarely on the national governments policy agenda. In 2000 Spalding-Fecher, Williams and van Horen (2000:10) summarised them as follows:

Turning to the bulk supply of energy in South Africa, several categories of environmental problems are present. The first and most fundamental is the long-term unsustainability of the resource base...over 90% of the country's primary energy comes from non-renewable resources. Not only is this situation patently unsustainable in the long term (whether the latter is measured in decades and centuries), it also has more serious environmental implications in the short term than might have been the case if, for example, the energy mix had been dominated by relatively cleaner energy sources such as natural gas, hydropower, wind or solar.

In 1997, the UNFCCC was extended by means of the Kyoto Protocol that was adopted at an international summit in Kyoto, Japan on the 11th of December 1997. South Africa ratified the Kyoto Protocol on the 31<sup>st</sup> of July 2002. Although South Africa was a signatory to the protocol, it was not included on what was known as Annex I to the Protocol and

therefore was not required to have any set targets to reduce carbon emissions (Steenkamp, 2018:66). (Annex I countries were obliged to reduce their total carbon emissions by five percent below their emission levels in 1990 between 2008 and 2012). However, by becoming a signatory to the Kyoto Protocol South Africa was committing to reducing its carbon emissions.

#### 4.3.2 The Copenhagen (2009), Paris (2015) and Glasgow (2021) COP Agreements

South Africa made further commitments to reducing its global carbon footprint by signing the Copenhagen Agreement of 2009, followed by the Paris Agreement of 2016. Then President Zuma pledged at the Copenhagen Conference of Parties (COP) in 2009 that South Africa was targeting an emissions trajectory that would peak at 34% below a “business as usual” case in 2020 and then decline from 2035 in absolute terms (Department of Energy, 2016:48). At the follow-up COP17 meeting in Durban in 2011, representative stakeholders from the private and public sector agreed to 12 commitments, one of which was a governmental goal to create 300 000 new jobs in the “green economy” in South Africa by 2020 (Eberhard, Kolker & Leigland, 2014:7).

On December 12, 2015, representatives of 195 countries adopted the Paris Agreement (UN, 2015b) during COP21, which was held in Paris, France. The primary objective of the Paris Agreement was to limit global warming to 1.5 degrees Celsius. A new international agreement, The Intended Nationally Determined Contributions (INDC), was signed by countries, stipulating how they would address climate change through national policy (Baker, Burton, Godinho & Trollip, 2015:44). South Africa signed the Paris Agreement on April 22, 2016, thereby pledging to reduce its annual emissions by 614 million tons of CO<sub>2</sub>. According to the DoE (2015:14) in 2015, 96% of all energy generated by Eskom in South Africa was from coal. Its *'State of Renewable Energy'* (DoE, 2015) report stated that South Africa was responsible for 1.6% of all global greenhouse gas emissions and that these emissions came almost exclusively from the country's energy sector (2015:14). Renewable energy had therefore to be considered if South Africa was to deal with the environmental and social costs of its reliance on fossil fuels.

In 2021 South Africa updated its INDC ahead of the UN's COP26 conference in Glasgow in November that year. South Africa's revised commitment translates to carbon emission targets ranging from 350 to 420 metric tonnes of carbon dioxide equivalent (Mt CO<sub>2</sub>-eq). According to Ngcuka (2021), wealthy countries pledged \$100 billion a year at COP25 to

assist developing nations with their climate mitigation strategies. According to the updated carbon targets, South Africa is expecting to attract \$8 billion per year in climate financing by the year 2030.

#### 4.3.3 The *National Climate Change Response Policy White Paper* (2011)

Having adopted both the Kyoto Protocol and the Paris Agreement, the Department of Environmental Affairs (DEA) realised their commitment to reducing greenhouse gas emissions in the following policies to Address Climate Change: The *National Climate Change Response Strategy for South Africa* (Department of Environmental Affairs and Tourism, 2004) and the *National Climate Change Response White Paper* (Republic of South Africa, 2011) and within certain chapters and sections of the National Development Plan 2030 (2012).

While the focus of the *National Climate Change Response White Paper* is on decarbonisation, Baker et al (2015:44) argue that the Paper's commitments were not integrated with other policies nor other government departments such as the Department of Economic Development<sup>22</sup> and the Department of Energy.

### 4.4 The development of South Africa's renewable energy programme

According to the DoE (2015), the three White Papers discussed above have formed the basis of South Africa's renewable energy programme: the 1998 *White Paper on Energy Policy*, the 2003 *Renewable Energy White Paper*, and the 2011 *National Climate Change Response White Paper*. However, additional national development policy documents such as the Reconstruction and Development Programme (RDP), the National Development Plan (NDP), the Integrated Energy Plan (IEP) and the Integrated Resource Plan (IRP) have also been influential.

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<sup>22</sup> Now known as the Department of Trade, Industry and Competition (2019).



The National Energy Act of 2008 (Government Gazette No.31638) mandated the minister of energy to publish an Integrated Energy Plan (IEP) annually. The IEP reviews the energy consumption across various sectors (transport, agriculture, commerce and industry) of the economy and provides suggestion based on demand. In essence, the IEP serves as a guideline for energy 'infrastructure investments' (Government Gazette No.31638, 2008:10). While the IEP reviews the energy sector's needs as a whole, the IRP (2010) focuses specifically on electricity generation, distribution and pricing pathways.

#### 4.4.1 The Integrated Resource Plan (2010)

South Africa's Integrated Resource Plan for Electricity (IRP) of 2010 is essentially a planning document for the electricity sector for the period 2010 to 2030 which sets out the primary regulatory framework for the sector. A key objective of the IRP is to determine long-term electricity demand in South Africa. The IRP details the generating capacity, the type of energy generation, the cost factors, and the timing of how the electricity demand should be met in various scenarios and discusses the trade-offs of each (DoE, 2011:vi). The IRP stresses the need for South Africa' to diversify its energy production in order to meet the growing demand of the country and stipulates that government will consider all energy sources 'equitably from a financial analysis perspective to adequately evaluate their performance and potential (DoE, 2015:19). The IRP (2010) stresses that as part of the country's energy mixture, 11.4 GW has to come from renewable energy sources.

According to the DoE (2011:7) the IRP has to undergo a revision every two years. The IRP was updated in 2013 wherein renewable energy capacity was projected to generate an additional 17.8GW for the national grid by 2030; of note is that nuclear energy generation was identified as falling under the umbrella term 'renewable energy generation' (Giglmayr, Brent, Gauché & Fechner, 2015:780). While the IRP noted the need to commission more nuclear energy plants, it highlighted the importance of examining not only the associated cost and financing implications but also safety and environmental concerns. Baker et al (2015:ix) argue that the IRP, while mentioning environmental and climate change concerns, appeared far more concerned addressing the energy supply crisis of the country. As noted by them, legislation such as the IRP incorporated low-carbon energy, but climate change mitigation was not the focus. The focus lies in addressing the country's energy demand, driving political agendas, and shifting to the most cost-competitive energy infrastructure development.

#### 4.4.2 The REIPPPP (2011)

In 2008 the REIPPPP was initially conceived as a renewable energy feed-in tariff (REFIT) to secure renewable energy from private investors. The economic principle behind the REFIT was that it would establish a tariff (price) that covered the cost of energy generation and allowed the developer to add a 'reasonable profit', thus making it attractive for developers to invest (Government Gazette No.32122, 2009). However, this approach was abandoned in favour of the REIPPPP after the REFIT programme was challenged on constitutional grounds by the National Treasury, which argued successfully that the National Energy Regulator of South Africa (NERSA) was not allowed to sign nor select preferential power producers through a procurement procedure.

In November 2011 the then Department of Mineral Resources (DMR), along with the National Treasury and the Development Bank of Southern Africa, established the Independent Power Producer Office (IPPO) with the mandate to secure electricity from the private sector (IPPO, 2021a:1). The programme's primary objective was to secure the country's energy supply by diversifying energy generation. In the IPP process, Eskom's role would be confined to buying the electricity produced and providing the grid connection. A further objective of the IPP design was to address previously disadvantaged groups however important to note here is that local energy needs, including household energy poverty and local government capacity problems, were not clearly recognised in the understanding of socio-economic development. This disjuncture between a renewable energy sector that has been designed around a national grid and national development objectives, the energy needs of poor households and the lack of capacity in local government to manage its electricity infrastructure is a key focus of this dissertation.

The procurement of contracts by independent power producers was designed as a competitive bidding process. Bidders (from here on referred to as IPPs (Independent Power Producers)) would submit bids during 'bid window' auctions and be assessed by the DME according to two components: tariff pricing and economic development commitments. The three regulatory authorities overseeing the bidding process were the Department of Energy, the National Treasury, and the Development Bank of Southern Africa, (DoE, 2015:38). Table 4.2 depicts the seven bidding rounds between 2011 and 2022. This shows the number of megawatts contracted from renewable energy sources increasing over the years.

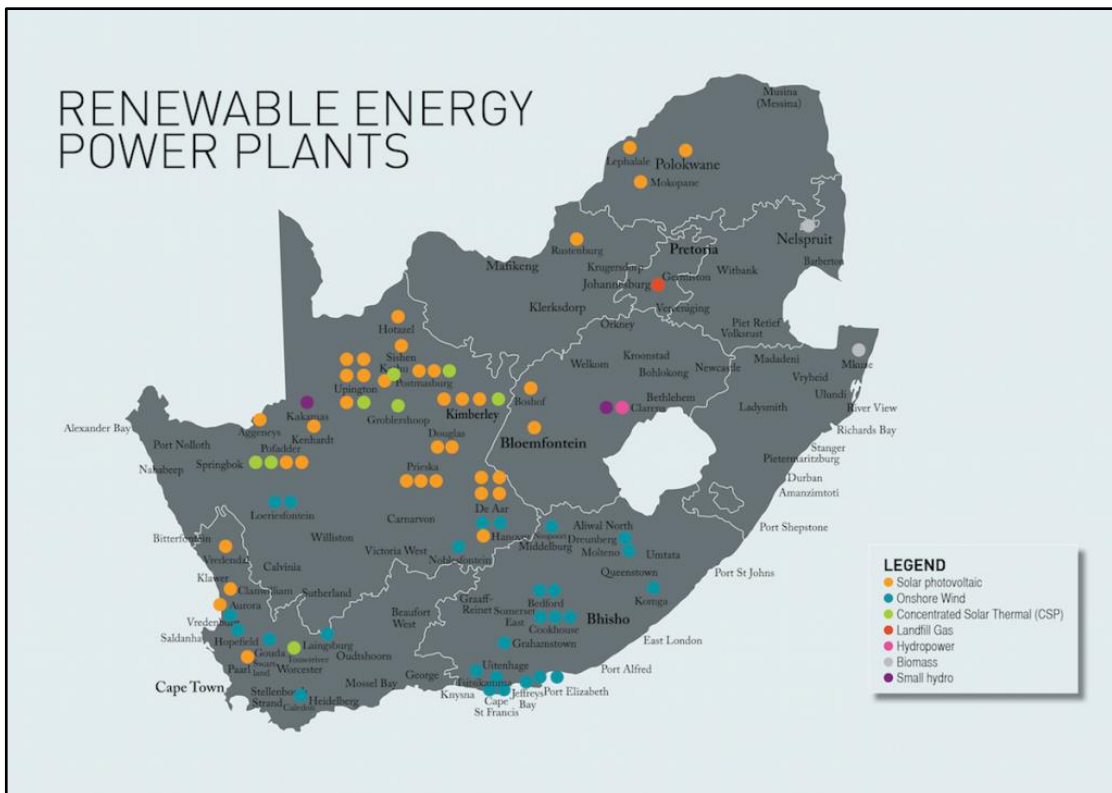
Table 4.2: The IPP bid windows from 2011-2022

Bid window 1	Bid window 2	Bid window 3	Bid window 3.5	Bid window 4	Bid window 5	Bid window 6
<ul style="list-style-type: none"> <li>• Sub-mission date: November 2011</li> <li>• 1425 MW contracted</li> <li>• Signature of the PPAs: November 2012</li> </ul>	<ul style="list-style-type: none"> <li>• Sub-mission date: March 2012</li> <li>• 1040 MW contracted</li> <li>• Signature of the PPAs: May 2013</li> </ul>	<ul style="list-style-type: none"> <li>• Sub-mission date: August 2013</li> <li>• 1475 MW contracted</li> <li>• Signature of the PPAs: December 2014</li> </ul>	<ul style="list-style-type: none"> <li>• Sub-mission date: March 2014</li> <li>• 200 MW contracted</li> <li>• Signature of the PPAs: April 2018</li> </ul>	<ul style="list-style-type: none"> <li>• Sub-mission date: August 2014</li> <li>• 2205 MW contracted</li> <li>• Signature of the PPAs: April 2018</li> </ul>	<ul style="list-style-type: none"> <li>• Sub-mission date: April 2021</li> <li>• 2,583 MW contracted</li> <li>• Signature of the PPAs: October 2021</li> </ul>	<ul style="list-style-type: none"> <li>• Sub-mission date: October 2022</li> <li>• 2 600 MW contracted</li> <li>• Signature of PPA's: <i>tbc</i></li> </ul>

Source: IPP Office (Online: <https://www.ipp-renewables.co.za/>)

Figure 4.3 shows the location of renewable energy power plants awarded to successful bidders up to 2018.

Figure 4.3: Renewable energy power plants in South Africa up to 2018



Source: Energy Intelligence, 2022

Originally tariff pricing accounted for 70% of the assessment scorecard while the economic development component accounted for 30%. These qualification criteria were, however,

updated for bid windows 5 and 6. According to the DMRE (2021), this was to save time and cost for the IPPs by creating a more efficient bidding process and streamlined procurement. IPP assessment scoring now allocates 90% to tariff pricing and 10% to their B-BBEE contribution. Economic development commitments are still incorporated into IPPs' agreements with the DMRE (2021), but these no longer feature on the scorecard. The economic development component of the REIPPPP has seven elements: job creation, local content, local ownership, preferential procurement, management control, enterprise development and socio-economic development.

The DMRE (2021:11) has summarised these as follows:

- Job creation is aimed at creating employment for black people, especially for people from the local community during the construction phase;
- Local Content which refers to the percentage of the total value of the IPP that must be spent on South African services and goods;
- Ownership/shareholding mandates the IPP to provide ownership to South African entities and local communities;
- Preferential procurement refers to preferential procurement for black female vendors and companies that meet South Africa's Broad-based Black Economic Employment Act of 3003;
- Management Control places the emphasis on hiring black people in top level managerial roles within the company;
- Enterprise development focuses on developing black business owners and entrepreneurs;
- Socio-economic development aims at addressing the needs of local 'host' communities.

Eberhard and Naude (2017:24) noted that while the economic development criteria were important for political buy-in they did raise the tariff costs proposed by the IPPs. Table 4.3 below shows the relative weighting of these elements for bid windows 1 to 4.

Table 4.3: The Economic Development bidder criteria for IPP proposal

<b>Economic Development objective</b>	<b>Weighting in Percentage</b>
Job creation	25
Local content	25
Ownership	15
Management control	5
Preferential procurement	10
Enterprise development	5
Socio economic development	15

Source: Eberhard & Naude (2017)

According to the IPPO (2021a:23), under bid windows 1 to 4 all IPPs structured their commitments to local community ownership through the allocation of shares in their projects to community trusts, the initial share purchase funded through loans. The potential return to trusts is considerable, with 'qualifying communities' projected to receive some R15.5 billion net income over the 20-year life of the projects. However, as noted by the IPP office, while some Trusts had started to receive dividends by 2021, 'the bulk of the money will start flowing into the communities from 2028 due to debt repayment obligations in the preceding years' (IPPO, 2021a:23).

According to the IPPO (2021a:35), local socio-economic development projects are expected to focus on five sectors: health care, social welfare, education and skills, general administration, and enterprise development. IPPs are expected to submit quarterly reports to the IPPO which monitors their performance against these objectives; failure to adhere to their contracts could result in power purchaser agreements being terminated. The REIPPP's socio-economic development and enterprise development requirements are presented as playing a crucial role in the upliftment of local communities (DoE, 2020:1); the performance of the IPPs in De Aar in this regard is reviewed in Chapter Eight.

#### 4.4.3 Contestations around energy policy and the 'just transition'

The introduction of renewable energy into South Africa's energy mix under REIPPPP has been a prolonged process involving numerous challenges and disputes, the details of which are beyond the scope of this chapter but briefly touched on here. Key concerns related to the REIPPPP were framed around the threat it posed to the coalmining areas of the country, the potential increase in electricity tariffs, the extent to which renewable energy could address the instability in the country's electricity network and the lack of significant job creation associated with it. (On this see: Kurger, Nygaard & Kitzing, 2021; Morris, Robbins, Hansen & Nygaard, 2020; Jeffrey, 2018; Davies, Swilling & Wlokas, 2017; Eberhard & Naude, 2016; Baker & Wlokas, 2015). Notably, however, household energy poverty was not an issue that received attention.

Sceptics contested the urgency around the development and expansion of a renewable energy sector, with the country's powerful trade union, the National Union of Metalworkers of South Africa (NUMSA), arguing that if the transition from fossil fuels was to occur, the transition had to be 'just'. By this they meant that workers from the coal sector and those that depend on mines for their livelihoods had to be reskilled and incorporated into a new green economy which they proposed the government must prioritise. NUMSA (2020:10) has been vocal in their disapproval of the REIPPPP programme: 'The government is in such a hurry to destroy lives of workers because of politically connected business interest in the renewable space'. It was however quick to point out that it was not against renewable energy but, rather, against the design of the REIPPPP programme. In related vein, van Diemen (2022) has asserted that South Africa is threatened not only by climate change but also by a transition which would be detrimental to the country, should the transition to a low carbon emissions economy lack regulation and therefore remain unjust.

Resistance to the introduction of renewable energy through the REIPPPP has been for a range of reasons (Baker & Wlokas, 2015). According to Baker (2015a), the REIPPPP was initially criticised for favouring established renewable energy companies. As indicated above, politically the most significant opposition to the REIPPPP has stemmed from concerns around job losses in the coal sector, which led to delays around the signing of IPP contracts under bid windows 3.5 and 4 (Yelland, 2017). NUMSA and Transform RSA attempted to interdict the signing, arguing that the rollout of renewable energy projects would lead to major job losses within the coal sector (NUMSA, 2012; NUMSA, 2018; Malope 2022). Environmental activists were suspicious that the halting of the procurement

programme was an indication of a possible nuclear deal signing (Moyo, 2017; le Roux, 2016; Fig, 2014). Eskom, however, denied all claims that they were 'against' renewable energy procurement.

As detailed by Malope (2022), South Africa's trade union movement has led the way in insisting that the shift from fossil fuels to renewable energy development must be a 'just transition' which addresses the urgent need for the creation of alternative jobs for coal workers in the first instance. NUMSA has also been critical of the design of the REIPPPP because of its reliance on private, profit-driven investment. As the idea of a just transition has gained acceptance in policy debates it has been broadened to encompass the need for sustainable development and addressing social inequalities more generally. Missing from the debate, however, has been a focus on what the just transition should involve for marginalised communities hosting renewable energy projects, many of them in the Northern Cape Karoo (Malope, 2022).

In this context the search for alternative sources of energy has been fraught. Reflective of the enduring legacy of the MEC, major debates have centred on the potential of non-renewable energy such as shale-gas in the Karoo and nuclear energy (supported by uranium mining) to address South Africa's energy shortfall; proponents of these alternatives have questioned the competitiveness of renewable energy technologies in relation to fossil fuels. In 2010 and again in 2016 the state's interest in the exploration of the potential for shale-gas mining in the Karoo was strongly contested by activist groups such as Treasure the Karoo Action Group (TKAG), Southern Africa Faith Communities Environment Institute (SAFCEI) and Earthlife Africa. They were particularly concerned about the environmental threat posed by shale-gas mining in the water-scarce Karoo but also questioned the economic assumptions being made (Koyana, 2017; Hellyer, 2017; Etheridge, 2017; Dentlinger, 2017; Wildenboer, 2017; Naidoo, 2017). The call to incorporate more nuclear energy into South Africa's energy mix in response to Eskom's supply crisis also sparked fierce debate among activist groups, Eskom and the government with regard to the financial burden it would impose, and the health and safety risks involved (Eberhard, 2016; Muller, 2016; Hogg, 2016; Winkler, 2017; Koyana, 2017; Makana, 2017; African News Agency, 2017). Proponents of renewable energy pointed to the need for South Africa to respond to climate change and the steady decline in the cost of renewable energy (Bischof-Niemz & Fourie, 2016).

Since the load-shedding crisis of 2008, the policy debate on energy security in South Africa has been heated (Odhiambo, 2009; Pegels, 2010; Sharife & Bond, 2011; Krupa & Burch, 2011). The construction of the Medupi and Kusile power stations has not resolved South Africa's energy crisis but added to it as construction costs soared (Friedman, 2021; Illidge, 2022) and allegations of corruption gathered force (Hogg, 2015; Hunter, 2015). In 2015 South Africa experienced another round of severe 'scheduled' blackouts that knocked the economy badly (Bischof-Niemz, 2019:9). Loadshedding was impacting all aspects of society across the political, economic, and social spheres. A report by consultants tasked with evaluating the reasons behind the 2015 blackouts described Eskom's entire generation fleet as severely undermaintained and aged (Comrie, 2022).

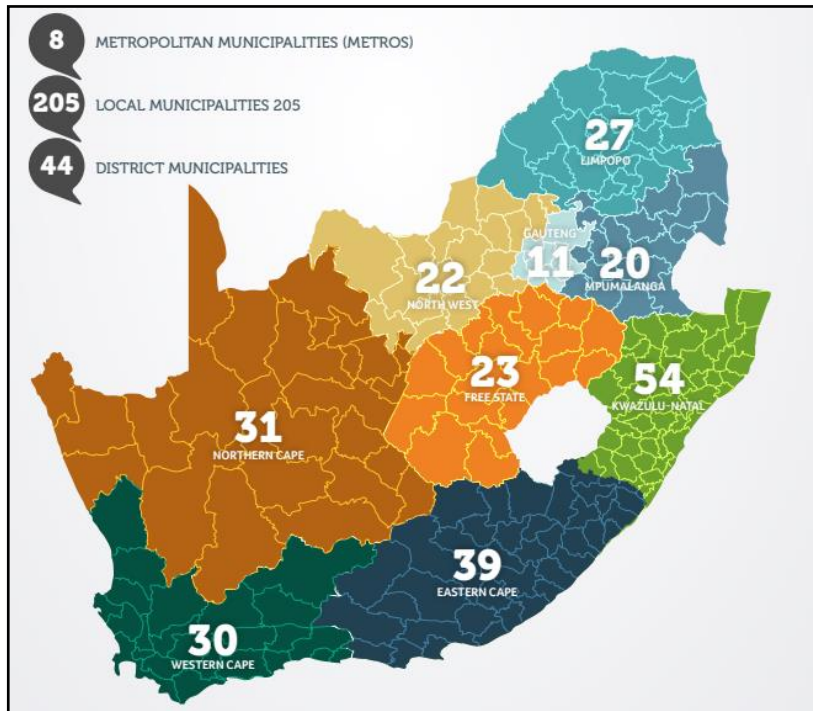
#### **4.5 Local government's responsibility for energy distribution**

This final section briefly describes the role of local government in the distribution of electricity; this is important background for the discussion on the challenges facing the Emthanjeni Local Municipality in Chapter Five.

After the democratisation of South Africa, local municipalities were elevated to function as a third sphere of government, alongside the national and provincial spheres. South Africa was divided into 205 local municipalities in 44 district municipalities and eight metropolitan municipalities as shown in Figure 4.4 below.



Figure 4.4: The 257 metropolitan, district and local municipalities in South Africa, 2022



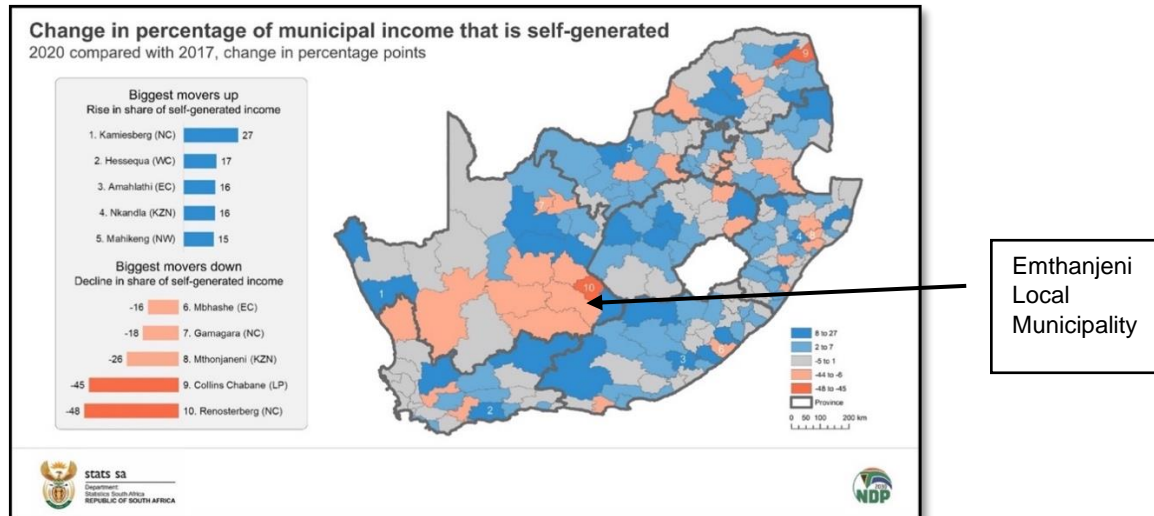
Source: SALGA annual report 2021-2022

According to Section 214 (1) of the South African Constitution, 'an Act of Parliament must provide for (a) the equitable division of revenue raised nationally among the national, provincial and local spheres of government' (Republic of South Africa, 1996). From this stemmed the Divisions of Revenue Act (DoRA) which regulates the division of funds to national, provincial, and local government across the country. The allocations are made in the form of conditional and unconditional grants (Government Gazette No.36555, 2013). Unconditional grants can be used by municipalities at their own discretion while conditional grants are allocated to municipalities for specific infrastructural development and maintenance projects. Should the conditional grant not be used within a financial year then the grant allocation must be paid back to National Treasury. Municipalities can also apply for additional grants such as the Municipal Infrastructure Grant (MIG) and the Integrated National Electrification Programme (INEP) grant.

According to Statistics South Africa (2020), 71% of municipal revenue is self-generated and the remaining 29% is from national government's subsidies and grants. However, this statistic obscures the imbalance between the metropolitan areas, which are able to generate up to 80% of their revenue, and local municipalities that are primarily rural and able to generate only 28% of their revenue themselves (StatsSA, 2020). As can be seen

in Figure 4.5 below, the Emthanjeni Local Municipality is one of several rural municipalities that showed a major decline in self-generated income between 2017 and 2020.

Figure 4.5: A comparison of municipal income that was self-generated in 2020 and 2017



Source: Statistics South Africa (2020), available: <https://www.statssa.gov.za/?p=14537>

What is important to note is that the sale of electricity is the single most important self-generated revenue stream for local municipalities. A 2020 *Financial Census of Municipalities* (Statistics South Africa, 2020:4) reported the average make-up of municipal revenue as follows:

- 28.8% from grants and subsidies
- 27% from electricity sales
- 16.8% is received from property rates.
- 10.8% from public donations, the issuing of licenses and permits and fines.
- 9.9% from water sales, and
- 6,8% from sewerage and sanitation charges (4%) and refuse removal charges (2.8%).

The money received from electricity sales is therefore a vital component of municipal revenue and annual budgets. However, the delivery of electricity services is also the largest expenditure item for municipalities, with on average 21.4% of operational budgets allocated to purchasing electricity from Eskom for distribution (Statistics South Africa, 2020:5). This funding model has added to the pressure on service delivery in local municipalities, calling into question the financial sustainability of local Karoo municipalities

such as the Emthanjeni Local Municipality in the long term. This will be discussed in the next chapter.

## 4.6 Conclusion

This chapter has provided an overview of key policy developments related to the contested introduction of renewable energy into the country's energy mix. After the democratisation of South Africa, the ANC government prioritised energy access over energy security. The electrification programme and the FBE subsidy can be understood as addressing social justice however, while accessibility was mostly successfully addressed affordability was not. Policies such as the Free Basic Electricity policy do not provide sufficient subsidised electricity to poor households; nor does it take household size and the varying energy needs regionally into account. While the indigency policy attempted to address social inequalities, local municipalities do not see this as a social good as they depend on the sale of electricity in order to generate revenue to fulfil their service delivery mandates.

As discussed in the previous chapter, the importance of scale as part of my conceptual framework lies in the way that it alerts one to the different locations and interests of all the actors involved. The dominance of coal-fired power plants for producing energy made shifting to cleaner sources of energy difficult. Powerful actors are committed to the national grid and continue their fossil fuel reliance; however, they have been forced through international commitments to expand the renewable energy capacity of the country. The renewable energy IPP programme is a national programme with global spin-offs, reducing the country's reliance on coal. While the REIPPPP programme addresses some global commitments, its primary function is to secure energy supply for the country; it does not mention providing energy security and stability to local municipalities.

While the need for local spin-offs through the REIPPPP programme's economic development criteria has been recognised, the programme has not been designed with household energy needs in mind. Nor have the interests of local government in the design of IPPs' SED and ED programme in the REIPPPP programme been considered. The following chapter will unpack the development challenges facing Karoo towns, including the capacity and budgetary constraints of the local municipality in relation to the maintenance of its electricity infrastructure and revenue collection.

## **Chapter Five: Development challenges in the Northern Cape and De Aar**

In this chapter I turn to my case study site. The industrial-scale renewable energy development described in the previous chapter is unfolding in the Karoo in a region with a very distinct and in many ways fragile environment. The Northern Cape, described by Penn (2005) as a 'forgotten frontier' of the colonial era, has been a centre for extensive livestock farming and mining in South Africa since the mid nineteenth century. However, after the discovery of gold in the Witwatersrand in the 1880s, it was left behind economically as well as politically. In recent years, however, large international developments around astronomy (the SKA), renewable and non-renewable sources of energy such as shale gas and uranium mining have gained traction in the area, leading to renewed interest in this area by external investors and the state .

The structure of the chapter is as follows. Section 5.1 provides background on the ecology of the Karoo, its colonial history, and the establishment of De Aar. Section 5.2 addresses the Northern Cape Province after 1994, looking in particular at land use changes and the renewable energy developments as part of the REIPPP programme. Section 5.3 provides an overview of the Emthanjeni Local Municipality, including demography, the local economy and the municipality's financial challenges. Section 5.4 looks specifically at the electricity dispensation in the municipality, including challenges around distribution, the maintenance of infrastructure and financing. Finally, section 5.5 discusses the difficult relationship between the local municipality and the renewable energy projects in its backyard as a prelude to the discussion of the local development commitments of the IPPs in Chapter Eight.

### **5.1 Background on the Northern Cape Province**

#### **5.1.1 Karoo ecology**

The Karoo is often characterised as a vast, dry and peripheral area, dominated by large, isolated sheep farms with their iconic windmills, far from the centres of power. According

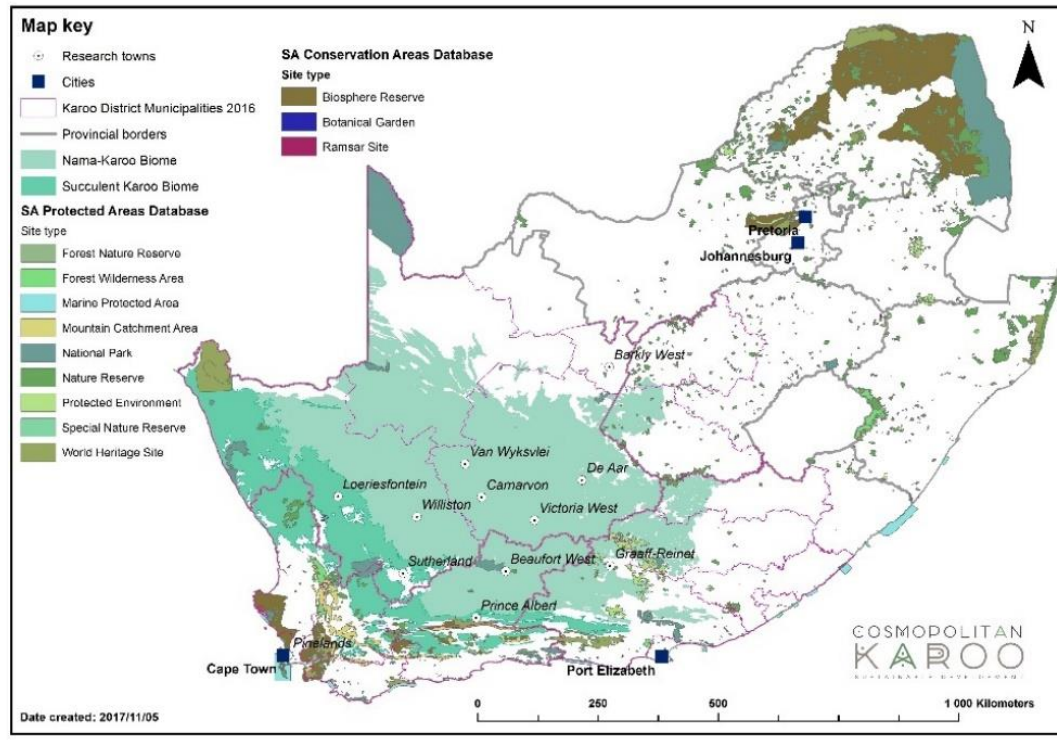
to the 'Karoo tourism' website (2022), it offers visitors 'wide open spaces, clean unpolluted air, starry nights and extremely friendly people'.<sup>23</sup> This depiction reinforces the notion that the Karoo is largely an empty space, a region that is available to exploit as developers see fit (Walker, 2019). As discussed in section 5.2.1 this account has been drawn on by both the state and private corporations in promoting investment in new land uses in the Karoo in the form of international astronomy projects and the investments in both renewable and non-renewable sources of energy. The 'emptiness' associated with the Karoo is disputed by researchers working on its history and local social conditions. (On this see Henschel, Hoffman & Walker, 2018.)

The Karoo is an arid to semi-arid region spread over four of South Africa's nine provinces (Northern Cape, Western Cape, Eastern Cape, and the Free State), the bulk of it falling within the Northern Cape. Depending on how one defines its administrative boundaries, it covers between almost a third and 40% of the country's land surface. (On this see Henschel, Hoffman & Walker, 2018:151) and the Department of Agriculture Land Reform and Rural Development's (DALRRD) draft Karoo Regional Spatial Development Framework (DALRRD, 2021). In environmental terms the Karoo comprises two biomes: the Succulent Karoo in the west and the Nama Karoo in the east. (See Figure 5.1 below.) The Karoo has a mean annual precipitation of between 100 and 400 mm, with rainfall decreasing as one moves west (Henschel, et al., 2018:151). The Succulent Karoo is home to an abundance of succulent plants and is a region of extraordinarily rich biodiversity. According to Milton and Dean (2015:127) both the Nama and Succulent Karoo biomes are sensitive to climate change and should be considered environmentally vulnerable areas.

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<sup>23</sup>Karoo tourism [online], Available: <https://www.karootourism.co.za/> [2022, 11 June]..

Figure 5.1: Map of South Africa showing Karoo biomes and provincial boundaries



Source: SARChI Chair in the Sociology of Land, Environment and Sustainable Development, 2017

The Northern Cape Province also boasts some of the largest mining operations and assets in the country. The Northern Cape mining sector contributes 23% to the province's economy (Northern Cape Economic Development Trade and Investment Promotion Agency, 2021:10). According to the Northern Cape Economic Development Trade and Investment Promotion Agency (NCEDA, 2022) the mines in the Northern Cape contribute 7% of the country's total mining value and hold some of the largest reserves for diamonds, iron ore, lead, copper, tiger's eye, manganese and zinc.

### 5.1.2 A 'forgotten frontier'.

The Karoo is an 'ancient landscape', with a fossil record that spans more than 500 million years (Milton & Dean, 1999:xxi). The archaeological evidence shows that the first people in the Karoo were the ancestors of the |Xam, hunter-gatherers who were living in the Karoo when European colonists first began to advance from the Dutch East India Company (DEIC) settlement at Cape Town during the early eighteenth century (Morris; 2018; McGranaghan, 2015). This advance initiated a history of land dispossession that impacted

profoundly on Karoo society, with both the Xam and pastoralist Khoikhoi people losing their land and independence (McGranaghan, 2015:525). This process forced these groups into servitude as farm labourers and domestic servants for the white colonists, with very little or no social standing in society.

After the British assumed imperial authority over the Cape Colony in the early nineteenth century, the Karoo became the backbone of the Cape's agrarian economy as a result of the extensive sheep farming it supported (Beinart, 2018:191). After failed attempts to produce fine wool from Merino sheep in England, Merino sheep were imported into South Africa to provide for the British textile industry and thrived in the warmer climate of the Karoo (Lilja, 2018:64). According to Beinart (2018:192), in the early 1800s the Cape had approximately 1,5 million sheep but as the demands of the English textile industries for fine wool increased, the number soared to 12 million by 1891 (Beinart, 2018:192). During this time the Karoo was seen by white settlers as an attractive destination for those eager to profit from the wool trade. In the late nineteenth century, the introduction of windmills drastically altered the Karoo landscape as this meant that farmers no longer needed to move their herds in search of water but could practise settled livestock farming on large, privately owned farms (Conradie, Piesse, Thirtle, Vink & Winter, 2013:12). With the introduction of fencing and windmills, the demand for shepherds declined and many farmworkers were forced to migrate for work (Lilja, 2018:64).

For much of the nineteenth and twentieth centuries, commercial sheep farming in the Karoo supported the local economy of small Karoo towns. For the Cape Colony, wool was a major export product between the 1830s and 1870s (Lilja, 2018:64). Beinart (2018:192) notes that for a brief period between 1880 and 1905 the pastoral economy of the Cape generated more income from wool than the diamond production in Kimberley. The mineral revolution would however overtake the wool market due to several factors, including the South African War (1899-1902), severe droughts and the outbreak of diseases (Beinart, 2018:192). The commercial farming economy bounced back with the advent of the First World War (1914-1918) but thereafter become less profitable as demand in England for wool declined.

By the 1939 there were still well over 11 million sheep in the Karoo, but the environment was starting to show signs of deterioration due to overgrazing (Hoffman, Skowno, Bell & Mashele, 2018:213). In the 1970s the wool market became more volatile, and the South African Rand collapsed. Coupled with the diminishing demand for mutton in the late half

of the twentieth century; commercial farm productivity declined (Conradie et al., 2013:10; Hill, Nel & Atkinson, 2011:399). Additional challenges such as the distance from markets due to the remoteness of farms and periodic drought also constrained livestock farmers (Conradie et al, 2013:8). A decline in state support for the agricultural sector in the 1980s added to the economic pressures facing many family-owned farms in the Karoo, resulting in a consolidation of farm ownership, with bigger farms and fewer owners (Beinart, 2018:199). This in turn undermined the viability of smaller Karoo towns whose local economies relied on their service role for commercial agriculture (Nel, Taylor, Hill & Atkinson, 2011:399). It also reduced the need for labourers, causing widespread retrenchments of farmworkers who were forced to move to town (Hill & Nel, 2008:206).

### 5.1.3 The development of De Aar

As already indicated in my introductory chapter, the history of De Aar is associated with the mining revolution and the development of railway lines across the Karoo to link the new mining centres first at Kimberley and then on the Witwatersrand ridge<sup>24</sup> to the port cities of Cape Town and Port Elizabeth. The town is built on a farm that was first surveyed in September 1837. The land was purchased by Jan Gabriël Vermeulen, who named the farm De Aar, a Dutch word interpreted as “the vein” after a spring on the farm. In 1881 surveyors from the Cape Government Railways system identified the farm as a suitable junction for a railway station which was completed in 1884. (See Figure 5.2 below.)

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<sup>24</sup> Spanning over three provinces: the Northwest, Gauteng and Mpumalanga



Figure 5.2: De Aar railway station, 1899



Source: with permissions, the McGregor Museum photographic archives, Kimberley, South Africa

In 1902, two brothers, Isaac and Wolf Friedlander, purchased the original De Aar Farm and subdivided the land for the development of a town hall, sports field and, of course, a church. Later that year pieces of land were auctioned for commercial plots and on the 20th of May 1904 the town was officially declared a municipality. Unlike most Karoo towns, then, the town was not formed around a church but owes its origin to the development of the railways in South Africa, spurred by the discovery of diamonds near Kimberley in 1868. In a letter she wrote in 1906, South African author, Olive Schreiner described De Aar as 'a railway camp about 30 miles from [Hanover], all dust & flies & tin & rag shanties & little brick houses, & awful heat in summer'.<sup>25</sup>

The town quickly became the second most important railway junction in South Africa. The junction was significant because it linked the railway lines connecting Cape Town, Kimberley, Johannesburg and Port Elizabeth (now Gqeberha) as well as South Africa with South-West Africa (present-day Namibia). The railway network also held significance for

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<sup>25</sup> Copyright transcription: © Olive Schreiner Letters Project. This transcription can be freely used as long as copyright is acknowledged and it is referenced using the following citation: 'Olive Schreiner to Robert Franklin ('Bob') Muirhead, 8 May 1906, MacFarlane Collection, Olive Schreiner Letters Project transcription.

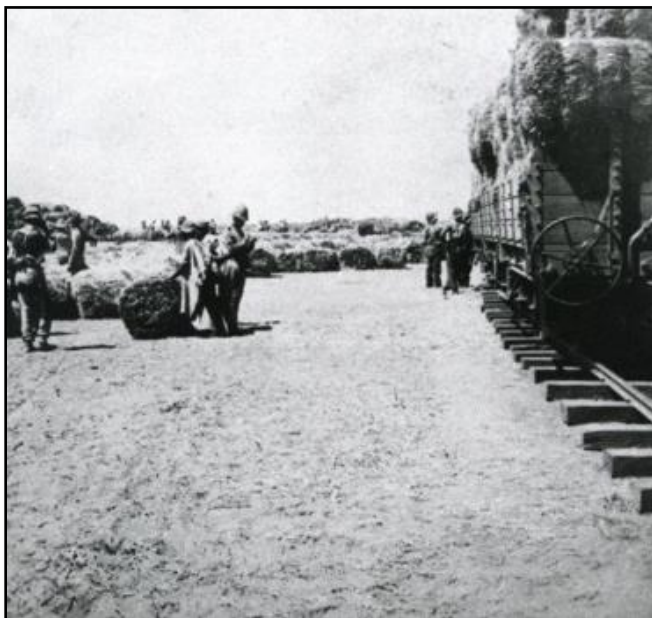
the transportation of troops and supplies for the British during the South African War between 1899 and 1902, as can be seen in Figure 5.3 and Figure 5.4 below.

Figure 5.3: Military transport wagon at De Aar railway station c1899/1901



Source: The McGregor Museum Photographic Archives, Kimberley, South Africa

Figure 5.4: Fodder for British war horses arriving in De Aar, 1900



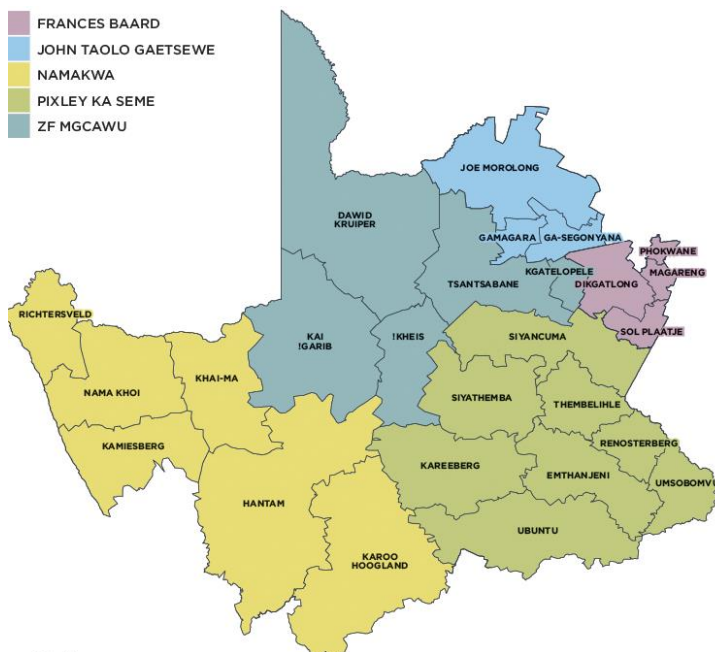
Source: The McGregor Museum Photographic Archives, Kimberley, South Africa

As already mentioned in Chapter One, the population of the town has fluctuated over the years. De Aar’s population grew overall by 630% between the years 1911 and 2011 (Hill & Nel, 2018:205). Today, however, De Aar is one of the larger 'small towns' in the Karoo and identified as a 'strategic regional node', or anchor town. Anchor towns, according to the Karoo Regional Spatial Developmental Framework<sup>26</sup> (DALRRD, 2021:85), will assist other smaller Karoo towns by acting as support towns towards spatial development.

## 5.2 The Northern Cape Province after 1994

After 1994, the former Cape Province was divided into three provinces: the Western Cape, the Northern Cape and the Eastern Cape. The Northern Cape was further divided into 26 local municipalities, grouped within five district municipalities (Frances Baard, John Taolo Gaetsewe, Namakwa, Pixley Ka Seme, and ZF MgCawu) as shown in Figure 5.5 below.

Figure 5.5: Northern Cape Province, district municipalities and local municipalities



Source: Municipalities.co.za

<sup>26</sup> The Department of Agriculture, Land Reform and Rural Development (DALRRD) along with the South African Local Government Association (SALGA) drafted the KRSDF in order to ensure a 'shared spatial, social and economic development vision for the [Karoo] region' (DALRRD, 2021:8).

The Emthanjeni Local Municipality falls within the Pixley Ka Seme District Municipality in the southeast, the second largest district municipality in the Northern Cape at 103 222 km<sup>2</sup>. As already noted, De Aar is the administrative centre for both the district and local municipality and thus the site for various government departments.

Walker and Vorster (2022:3) have drawn attention to how the small towns of the Karoo differ from settlements in the more populous eastern and northern parts of the country. While small, they are urban in social form and economic functioning. They also share certain commonalities, including being predominantly Afrikaans speaking, with most residents self-identifying as 'coloured'. The decline of the agricultural economy has impacted many of them negatively, with knock-on effects on revenue collection and levels of service delivery in local Karoo municipalities. (Hill & Nel, 2008:205). The SARChI Research Chair in the Sociology of Land, Environment and Sustainable Development conducted a series of household surveys in small towns in the Northern Cape between 2016 and 2021 (Vanwyksvlei, Sutherland, Loeriesfontein and Williston) which showed high rates of poverty, unemployment and social grant uptake (Vorster, 2019; Vorster & Eigelaar-Meets, 2019; Walker & Vorster, 2022). Social ills such as drug and alcohol abuse, high rates of teenage pregnancy and teenagers dropping out of school were found to be serious problems in all these towns (Walker & Vorster, 2022; Chinigò, 2020; Gastrow & Oppelt, 2019).

### 5.2.1 Land use changes in the Karoo

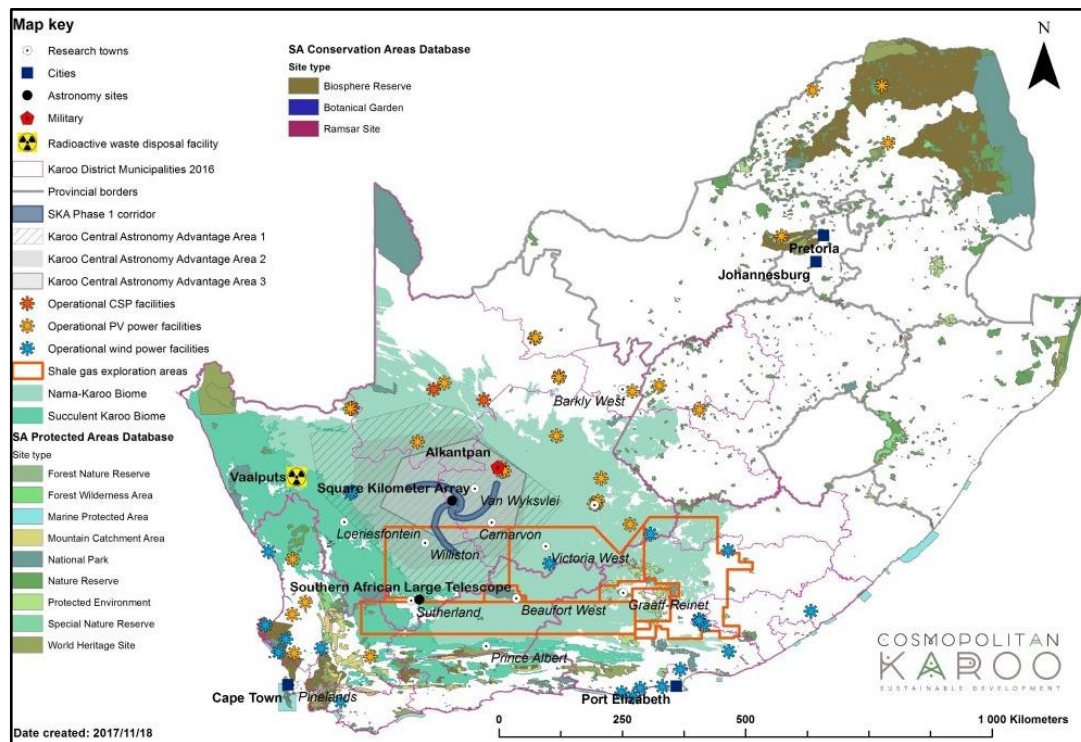
In 2011 the Karoo was home to less than one million people (Walker et al 2018).<sup>27</sup> Although the Karoo landscape is still dominated by white-owned farms, since the early 2000s this region has found itself at the centre of major land use changes, as its biophysical resources have acquired new value for cross-cutting investments not only in renewable energy but also astronomy, shale-gas and other forms of mining, conservation and commercial game farming. Although these developments promise national and global benefits, various researchers have questioned the extent to which the majority of Karoo residents are benefiting from them (Gastrow & Oppelt, 2019; Chinigò & Walker, 2020).

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<sup>27</sup> This equates to 1.9% of the country's population.

Two internationally significant astronomy sites have been developed in the Karoo. The first is the South African Astronomical Observatory site for optical astronomy outside the small town of Sutherland. The second is the Square Kilometre Array (SKA) radio telescope located near the town of Carnarvon, its 'core site' made up of 32 white-owned farms which were bought by the National Research Foundation through an acrimonious 'Land Acquisition Programme' from 2016-2019 (Terblanche, 2020). The international SKA organisation has fourteen member countries.<sup>28</sup> In preparation for its bid to host the SKA the South African government passed the Astronomy Geographic Advantage Act in 2007 which authorised the Minister of Science and Technology to declare an Astronomy Advantage Area (AAA) within the Northern Cape to control activities that could generate 'radio frequency interference' and thereby threaten the operational requirements of the SKA. (On this see Walker, Chinigò & Dubow, 2019). AAAs have since been declared over an extensive area of the Nama Karoo, as shown in Figure 5.6 below. To further protect its investment in the SKA, the state proclaimed its core site a National Park in 2020.

Figure 5.6: Map depicting the various land uses in the Karoo as of 2017



Source: SARChI Chair in the Sociology of Land, Environment & Sustainable Development, 2017

<sup>28</sup> The fourteen SKA member countries: Canada, China, France, India, Italy, the Netherlands, New Zealand, Spain, Sweden, the United Kingdom, Germany, Portugal, Australia and South Africa (<https://www.skatelescope.org/participating-countries/>)

The prospect of shale-gas mining in the Karoo required a Strategic Environmental Assessment (SEA) which brought to the fore divisions in the Karoo between those opposed to fracking on environmental grounds and those who hoped it might bring much needed jobs to the region. The absence of serious public consultation was, however, witnessed in 2016 during the SEA meetings held in Victoria West, Beaufort West, and Graaff-Reinet (Borchardt, 2016). The report by the Academy of Science of South Africa (ASSAf) on 'South Africa's Technical Readiness to Support the Shale Gas Industry' (ASSAf, 2016) noted the historical dispossession that took place in the Karoo but used the trope of the Karoo as a 'pristine but isolated landscape... [with vast] expanses of land'. The report noted that the existence of the AAAs around the SKA could mean that hydraulic fracturing could not happen in that province and 'applicants for shale gas exploration in the Northern Cape province should be required to work together with the Astronomy Management Authority to identify exploration sites appropriate both to SKA South Africa and the license application that would not pose a detrimental risk on the scientific performance of the SKA' (ASSAf, 2016:149). It also cautioned that proceeding with fracking would 'likely translate into a situation in which the Karoo itself is a minor beneficiary of any potential shale gas bounty'.

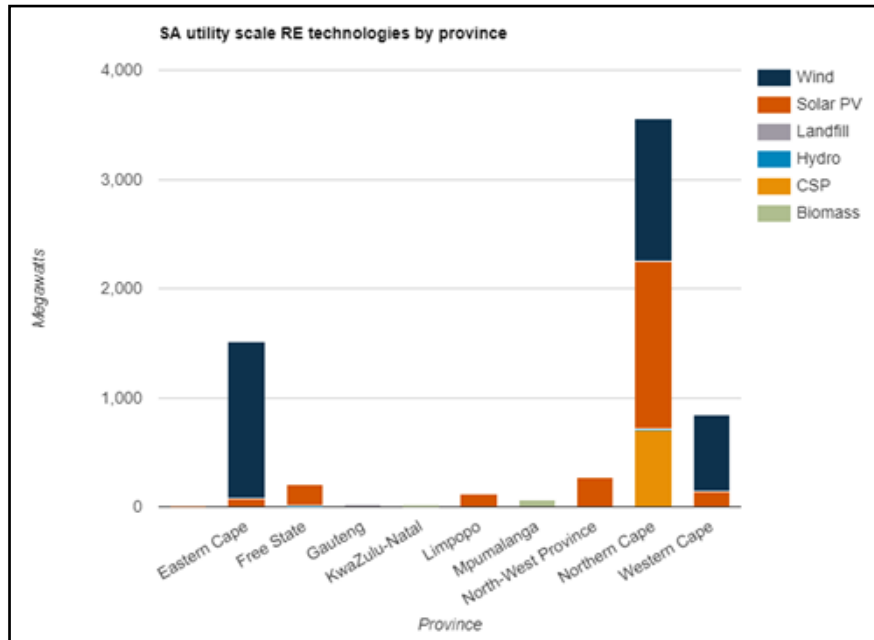
### 5.2.2 REIPP projects in the Northern Cape Province

The suitability of the Northern Cape Province for electricity generation from renewable energy sources has already been noted. As of March 2021, this province had attracted the bulk (66%) of the investment from IPPs in South Africa, with 59 of 112 approved projects falling within the province (IPPO 2021b:10).<sup>29</sup> Figure 5.7 below shows this dominance, as well as the relative levels of investment in solar and wind plants.

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<sup>29</sup> Investments totalled R139 billion out of a total of R209.6 billion; as of December 2021; 48 of the 59 IPP projects in the province were 'active' and 43 'operational' (IPPO 2021b:8).

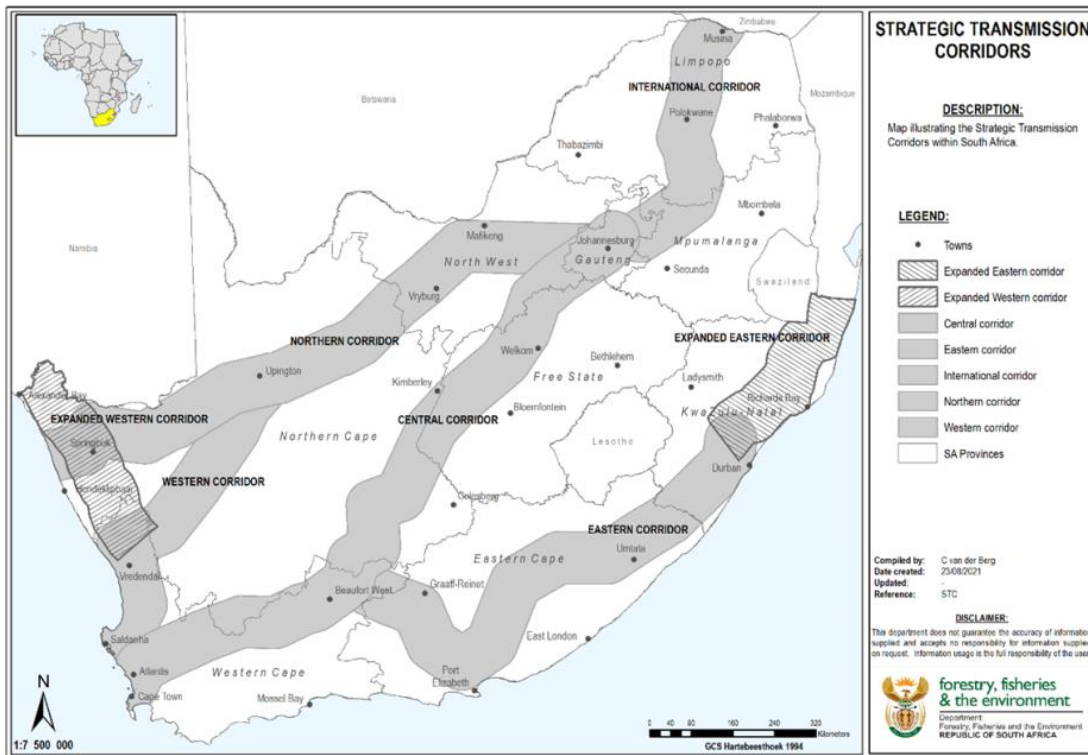
Figure 5.7: REIPPPP in South Africa by Province, 2019



Source: The Energy blog, cited in Nomjana, 2019

As of 2022, REIPPPP projects in the Northern Cape provided 56% of all electricity from REIPPPP projects to the national grid. A 2021 report noted that the combined output of the IPP projects in the Northern Cape could, in theory, meet the electricity needs of the entire province (IPPO, 2021b:8). However, during REIPPPP bid window three, it emerged that capacity challenges of South Africa's national grid would constrain the continued rollout of renewable energy projects in the Northern Cape. According to Eberhard & Naude (2017:91), South Africa's grid would have to be upgraded to increase transmission capacity, but Eskom did not have the financial resources to undertake this. In 2016 the national government approved Renewable Energy Development Zones (REDZs), aimed at streamlining the rapid development of renewable energy in seven corridors. According to the Council for Scientific and Industrial research (CSIR, 2019), the REDZ zones would prioritise capacity upgrades of the grid to accommodate the growing number of REIPPPP projects. De Aar falls within the central corridor as indicated in Figure 5.8.

Figure 5.8: The REDZ corridors



Source: Department of Forestry, Fisheries, and the Environment (DFFE, 2017)

Given the scale of the investment in the Northern Cape, the funds formally allocated to local economic development in the province are also high. According to the IPPO (2021b), the local economy has benefited from the enterprise development requirements of the REIPPPP. As of December 2021, R3.9 billion has been committed to enterprise development in the Northern Cape and a further R829 million per annum is committed to community trusts<sup>30</sup>; the aggregate investment into community trusts from all IPPs in the Northern Cape would therefore amount to R15.1 billion (IPPO, 2021b:10-11). The Independent Power Producers Office estimated that across all bid windows to bid window 4 (2018) 23,356 construction 'job years' had been created in the Northern Cape (IPPO, 2021b:12).<sup>31</sup> While this is an impressive figure, the number of actual jobs that this translates into cannot be read off the number of job years (Malope, 2022) and the local jobs that have been created are mostly temporary and generally low skilled. (See Davies, 2021; Malope, 2022).

<sup>30</sup> According to the IPPO's calculations per project, per life cycle (20-year programmes).

<sup>31</sup> A job year is the equivalent of a full-time employment opportunity for one person for one year.



According to the DoE (2019) and IPPO (2021a; 2021b) local communities in the vicinity of the IPPs projects are set to benefit substantially from their socio-economic development projects. Measured simply in terms of commitments, the contribution is significant: as of December 2021, the various REIPPPP projects had committed R12.6 billion to SED and R3.9 billion to ED commitments in the province (IPPO, 2021b:11-13). The DoE (2019:13) claimed that major development challenges in the province, such as high unemployment rates, erratic economic growth, and a lack of basic services, were being addressed by the REIPPPP projects, and that their SED and ED projects were aligned to meet the province's needs. However, according to the IPPO (2021b), the socio-economic development strategies of the IPPs were constrained by the prevailing socio-economic challenges.

The *REIPPPP Focus on the Northern Cape Provincial Report* (2021b:12) notes that local employment opportunities taper off once the commercial operations date of projects is reached but also states that the jobs that follow in the 20-year lifespan of the project are 'sustainable and environmentally friendly'. However, these claims need to be scrutinised through the lens of Holden et al.'s sustainable development model in which respecting the environment and advancing social equity and satisfying human needs are looked at holistically. While a full evaluation of these claims is beyond the scope of this doctorate, the limited extent of these investments in De Aar is discussed briefly in chapters six and eight. From this perspective the claims of the REIPPPP to truly sustainable development at the local level is overstated.

### **5.3 Overview of the Emthanjeni Local Municipality**

In this section, I provide a general overview of the Emthanjeni Local Municipality in terms of demography, local economy, governance, budget, and challenges regarding service delivery. What emerges clearly is its lack of capacity to address the development needs of the people in De Aar (and its other local towns); this compounds the problems facing poor households.

### 5.3.1 Demography

The Emthanjeni Local Municipality is the largest of the eight local municipalities in the Pixley Ka Seme District Municipality. As forecasted to 2021, by the Emthanjeni Local Municipality (2022b:3), it has a total population of 46,777 people in 11,583 households of which 3 799 households were registered as indigent. According to the 2016 'Community Survey' (Statistics South Africa, 2016), the municipality saw a 7.2% growth in population between 2011 and 2016. Just over half the municipality's population (52%) resided in De Aar, which in 2016 had a total population of 23 760 people in 5 356 households. As can be seen in Table 5.1 people identified as 'coloured' were in the majority (some 60% in 2016).

Table 5.1: Population composition by race for the Emthanjeni Local Municipality

Year	Black/African	'Coloured'	Indian/Asian	White	Total
2001	10 435	20 848	40	4463	35 786
2011	14 059	24 436	236	3388	42 119
2016	14 515	27 644	116	3129	45 404

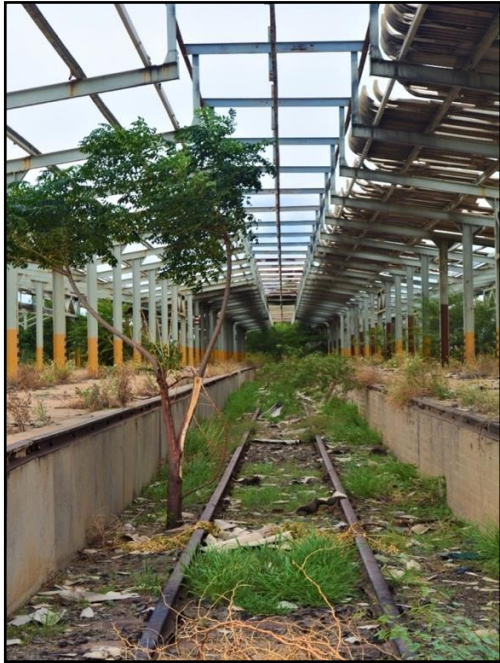
Source: The Emthanjeni Local Municipality Integrated Development Plan (2021b)

### 5.3.2 The local economy

According to the municipality the local economy is 'stagnant' (Emthanjeni Local Municipality, 2021a:39). Like most of the Karoo it depends primarily on servicing the local agricultural sector (primarily livestock farming with game farming on the increase), although there is a tiny manufacturing sector specialising in sand mining and the manufacture of bricks. However, the municipality notes that De Aar is exceptionally well located as a potential development centre in terms of its transport networks and space for industrial development (2021a:38). Much of the infrastructure of the station has, however, fallen into disrepair and is no longer used, meaning that significant renovations will be required (as can be seen in figures 5.9 and 5.10 below). As mentioned in section 5.1.3, the South African Local Government Association has similar plans to rejuvenate De Aar's transport sector. The Emthanjeni Local Municipality (2021a) also mentions its affordable labour and low tariffs and expectation of growing a tourism sector linked to its status as a solar energy hub. However, it gave no details of how these ambitions would be realised. I have encountered such expressions since my fieldwork began in 2017, without seeing any

realisation of them. (The increasingly negative perceptions of the municipality toward the solar and wind farms in the municipality in this time are discussed further in section 5.5.) What the IDP fails to acknowledge is the lack of skilled labour and how they would fund or start a maintenance programme for their aging infrastructure.

Figure 5.9: De Aar railway yard, 2018



Photographed by Stephanie Borchardt, April 2018

Figure 5.10: Dilapidated railway infrastructure in De Aar, 2018



Photographed by Stephanie Borchardt, April 2018

### 5.3.3 Governance

The Emthanjeni Local Municipality is run by the African National Congress (ANC), which received 60% of the vote during the 2021 municipal elections (IEC, 2021). After these elections political parties were represented on the 15-person council as follows: ANC nine seats; Democratic Alliance (DA) four, and one seat each to the Economic Freedom Fighters (EFF) and the newly formed Patriotic Alliance (PA).

In 2021 Good Governance Africa, a research and advocacy non-profit organisation, ranked the municipality 73<sup>rd</sup> overall in South Africa based on its governance indicators for administration, economic development, and service delivery (2021:13). The assessment pays attention to local infrastructure which the Emthanjeni municipality has neglected. Part of the reason for this can be attributed to the high vacancy levels in key posts, with finance and administration, waste and wastewater management, road transport, and electricity all areas with particularly high vacancy levels (Municipalities of South Africa, 2022). In 2022, the municipality had a 21% vacancy rate. Vacant posts included that of the manager of annual financial statements and assets, the manager of support services, the town planner and a tourism and communications officer (Emthanjeni Local Municipality, 2022c). In September 2022, the municipality published advertisements for a manager of the office of the mayor, the chief Financial Officer and Manager: Technical Services<sup>32</sup> (Emthanjeni Local Municipality, 2022c).

### 5.3.4 A municipal budget under strain

According to the National Treasury (2020:90), the Emthanjeni municipality has been in financial distress since 2016, reflected in poor cash-flow management, insufficient funding for maintenance of infrastructure and increase in debtors. While the municipality received unqualified audit reports for the 2016 and 2017 financial years, this was followed by qualified audit report from 2018 to 2020 (Emthanjeni Local Municipality, 2021c:19). In its 2020/21 Annual Report the municipality reported that its strategy to improve its audit rating is to invest in continuous training for its financial staff, appoint consultants to analyse its finances and undertake monthly expenditure checks to curb fruitless expenditure

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<sup>32</sup> A position overseeing infrastructure in the municipality which includes electro-technical services.

(2021d:38). Various committees and subcommittees were also formed to track expenditure, implement a credit control policy and review tender appointments.

Table 5.2 provides a comparison between budgeted and actual revenue and operating expenditure for the municipality's 2020/21 financial year. This shows a 14% shortfall in revenue collection and a 20% overspend.

Table 5.2: The Emthanjeni local Municipality Financial performance against budget for the 2020/21 financial year

<b>R'000</b>		
	<b>Revenue</b>	<b>Operating expenditure</b>
Budget	299 642	279 546
Actual	258 423	335 447
Difference	41 218	55 902
Percentage of difference	-14 %	-20

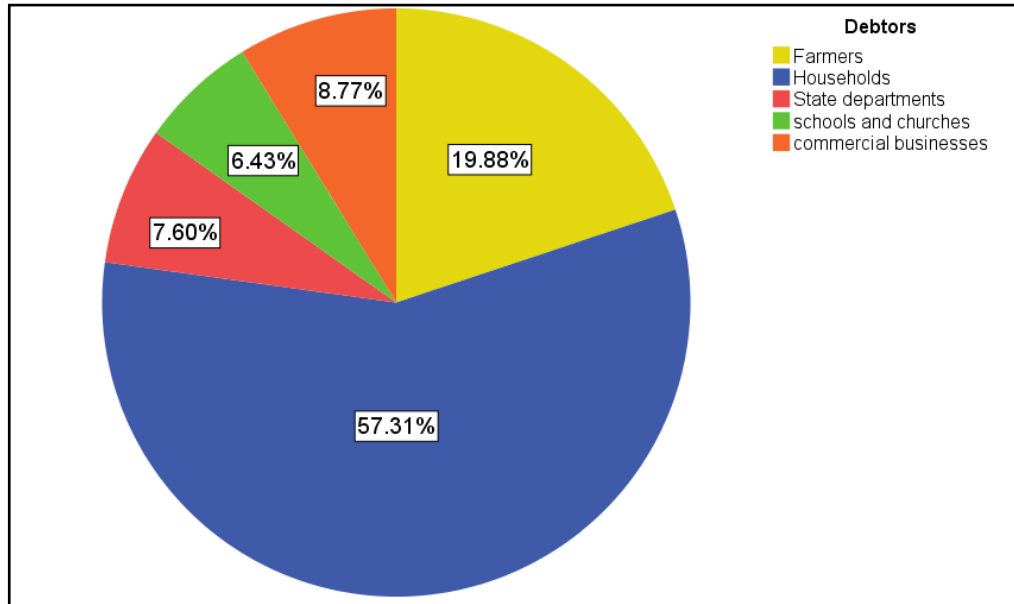
Source: adapted from the Emthanjeni Local Municipality's annual report 2020/21 (2021a:113)

The municipality relies heavily on grant funding, especially for infrastructural upgrades and maintenance, and in 2021/22 received over R27 million in capital funding from various sources such as the Municipal Infrastructure Grant (MIG), the Water Services Infrastructure Grant (WSIG), the Integrated National Electrification programme (INEP) and the Expanded Public Works Programme (EPWP) (Emthanjeni municipality, 2021a:139-140). According to the municipality's Annual Report for 2020/21, services charges accounted for 58% of revenue. Electricity sales and service charges amounted to a quarter (25.92%) of the projected income, at some R79 million (Emthanjeni Municipality, 2021d). The second and third most significant sources of income were property rates (R39 million) and charges for water service (R38 million) (Emthanjeni Local Municipality, 2021a:72). However not all the budgeted revenue was received, primarily attributable to non-payment by consumers.

Debt collection is a constant challenge for the municipality. Poor debt collection impacts directly on its capacity to maintain and upgrade its local water, sanitation, and electricity infrastructure, all of which are in dire need of upgrading and repair. The municipality's customers include residents, business, and organs of state. The list of debtors to the municipality in 2020 can be seen in Figure 5.11 which shows that most of the debt comes

from households. In a statement made to a media house, the municipal manager said that only 46% of residents pay their municipal services accounts (Purén, 2020).

Figure 5.11: Emthanjeni Local Municipality debtors, 2020



Source: Own graph, generated from Purén (2020)

In a statement to Purén (2020), the Chief Financial Officer of the local municipality provided the amount owed to the municipality by the five groupings in 2020 as follows:

- Households owed R98 million
- Farmers owed R34 million
- Commercial businesses owed R15 million
- State departments owed R13 million
- Schools and churches owed R11 million.

The statement received considerable criticism from farmers. A spokesperson for the Britstown Farmers Association argued that farmers do not purchase electricity through the municipality but have direct accounts with Eskom while the municipality was charging exorbitant rates on farms (Purén, 2020). According to this spokesperson the land values applied to a farm in the Emthanjeni Municipality was seven times that of a comparable farm in the Ubuntu municipality that borders Emthanjeni. The tensions between the Emthanjeni Local Municipality and farmers over this issue are discussed in section 5.5

below. Worth noting here is that the farmers that I interviewed all purchase their electricity directly from Eskom, not the local municipality.

While the sale of electricity is a major source of revenue for the Emthanjeni Local Municipality, its bulk purchase of electricity from Eskom is a major cost that it is struggling to manage. The municipality receives its electricity from Eskom at three intake points in Britstown, Hanover, and De Aar. The municipality also supplies electricity from their substation to ten boreholes, and two booster pump stations which provide drinking water to De Aar.<sup>33</sup> In the 2020/2021 financial year, the municipality spent approximately R71 million on bulk electricity purchases from Eskom which increased by more than R10 Million for the 2021/22 financial year (Emthanjeni municipality, 2021b:139). According to the municipality, the increase was attributable to NERSA-approved electricity tariff increase which they argue they cannot afford. They also argue that the increase has further repercussions for their budget as they cannot increase their tariffs as this would make electricity unaffordable to most residents in De Aar, Britstown and Hanover. The challenges of debt collection in relation to the municipality's electricity dispensation are discussed further in Section 5.4 below.

In addition to challenges around revenue collection, the municipality is facing problems with managing its expenditure. According to the Emthanjeni IDP (2021b:67), municipal salaries constitute 27.8% of its operating budget. Employee costs have increased steadily since 2014, as have the remuneration of councillors. In 2021 the municipality was considering applying to the South African Local Bargaining Council for an exemption from salary increases should they exceed 4% (2021b:139). The IDP further suggested that a staff productivity assessment was required to review the competency of its staff complement (2021b:139). The municipality also has a troublesome record with regard to unauthorised, irregular, and fruitless expenditure as shown in Table 5.3 below. In the 2020/21 financial year unauthorised, irregular, and fruitless expenditure amounted to 41% of total expenditure.

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<sup>33</sup> Due to the failures of the ELM's electricity infrastructure, certain areas of De Aar are frequently without water as electricity is required to pump water from the pump station and the boreholes (Emthanjeni Local Municipality Facebook, 2022). See Appendix 19

Table 5.3: Unauthorised, irregular, and fruitless expenditure of the Emthanjeni Municipality, 2016/17 - 2021/22

	R'000					
<b>Expenditure</b>	<b>2021/22</b>	<b>2020/21</b>	<b>2019/20</b>	<b>2018/19</b>	<b>2017/18</b>	<b>2016/17</b>
Unauthorised expenditure	87 873	62 887	62 888	53 536	31 744	76 894
Irregular expenditure	88 309	78 681	51 541	27 140	28 168	8 593
Fruitless & wasteful expenditure	89	10 701	13 554	4 957	3 775	941
<b>TOTAL</b>	<b>176 million</b>	<b>152 million</b>	<b>127 million</b>	<b>85 million</b>	<b>63 million</b>	<b>86 million</b>

Source: Audited outcome A1 2021- <https://municipalities.co.za/financial/1173/Emthanjeni-local-municipality>; Emthanjeni Municipality Annual Report 2021/22 (2021d)

The online Council meeting I was able to observe on 19 May 2021 laid bare the financial woes of the municipality (Emthanjeni Local Municipality, Facebook, 19 May 2021). Of all the municipal meetings that I attended; this meeting was by far the most significant for my research. It was attended by the Municipal Manager and the then Chief Financial Officer who updated attendees on the financial challenges of the municipality. At this meeting I learned that the municipal debt to Eskom was R200 million and Eskom had threatened three times to cut off all electricity to the municipality should they not come to a payment agreement. At this meeting members of the community who were present questioned the Municipal Manager regarding their electricity payments. The Municipal Manager acknowledged that the revenue the municipality collects from electricity sales is not ringfenced to cover its electricity purchases from Eskom. According to him the municipality was not struggling to make payments to Eskom because electricity accounts were not being paid; the major problem lay with residents who were not settling other municipal accounts, including property rates, taxes, and water bills.

To leverage additional funds, the municipality is resorting to a number of strategies. It has released a new renewable energy service tariff explicitly directed at the solar and wind farms in the area, based on the argument that the land use on these farms has changed from agricultural to industrial; this is dealt with in section 5.4.6. In 2022, the Emthanjeni Local Municipality also raised their electricity tariffs. A DA councillor issued a statement regarding the recent tariff increases which noted that while the approved electricity tariff



was raised by 7,4%, local businesses were receiving bills with tariff increases of up to 28% (Democratic Alliance, 2022).

## 5.4 Municipal electricity supply, infrastructure, and maintenance

### 5.4.1 Supply and distribution

Since 2009, the Emthanjeni Local Municipality has implemented an Incline Block Tariff (IBT) structure which penalises higher levels of electricity consumption (Emthanjeni Municipality, 2021a:31). As a household's consumption grows, so does the cost per kWh. Individuals who have prepaid electricity metres buy their electricity from registered vendors (the majority of which are in the town centre). They then receive a number (on the voucher) that they must enter into their metre which then uploads the amount of units they have purchased.

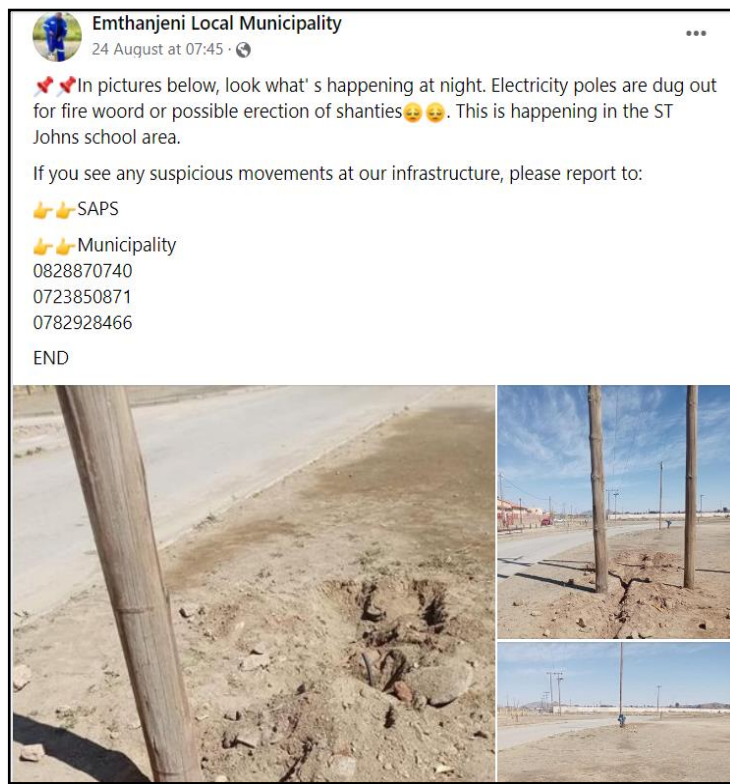
According to the 2016 Community Survey, 95.4% of municipal households have access to electricity (Statistics SA, 2016). According to the municipality (Emthanjeni Municipality, 2021b:121), all households in De Aar and Britstown have access to electricity; the small backlog is in Hanover. Approximately two-thirds of household within the municipality make use of pre-paid electricity metres and of these households around 30% – 3,916 households – receive the Free Basic Electricity subsidy (Emthanjeni Local Municipality, 2021b:62). The value of the free basic electricity service to these households amounted to R2,4 million in the 2020/21 financial year (Emthanjeni Municipality, 2021d:71). However, households are only granted this subsidy after they have made a prior purchase of electricity at a registered vendor. This process has to be repeated every month in order for the subsidy to be released to them.

According to the IDP (Emthanjeni Local Municipality, 2021b:159), one of the municipality's key performance indicators (KPI) for 2022 is to limit the amount of electricity that is unaccounted for to 18%. The municipality's total line losses during the electricity transmission and distribution phase have increased steadily from 13.91% in 2008 to 19.44% in 2021 (Emthanjeni Municipality, 2021a:62,72). While all energy dissipates naturally as heat during transmission, the municipality attributes its significant line losses to criminal activity by residents who bypass prepaid electricity metres. According to the

municipality, they could lose their electricity distribution license if their line losses are more than 22%, a target set by NERSA (Emthanjeni Municipality, 2021a:75). NERSA has however lowered its line loss threshold to 10%, which puts the Emthanjeni local Municipality at risk of losing its distribution licence (NERSA, 2022:12).

In 2022, the Emthanjeni Local Municipality posted numerous announcements on their Facebook page requesting people to use electricity sparingly. It also posted several warnings of blackouts should the vandalism of energy infrastructure continue. (See Appendix 20) People responded by requesting that security officials be appointed at the various transformers and substations. The municipality replied that it does not have the funds to secure additional security and the onus is on residents to report suspicious behaviour (Emthanjeni Local Municipality Facebook Page, August 2022). Figure 5.12 shows a post on the Emthanjeni Local Municipality official Facebook page, posted in August 2022 urging residents to report damage to its infrastructure. The post reports that the wooden poles for electricity lines are being dug out as a source of building material or to burn as firewood.

Figure 5.12: Emthanjeni Local Municipality social media post on theft of electricity poles



Source: Emthanjeni Local Municipality, public Facebook Page, 2022a

#### 5.4.2 Infrastructure grants

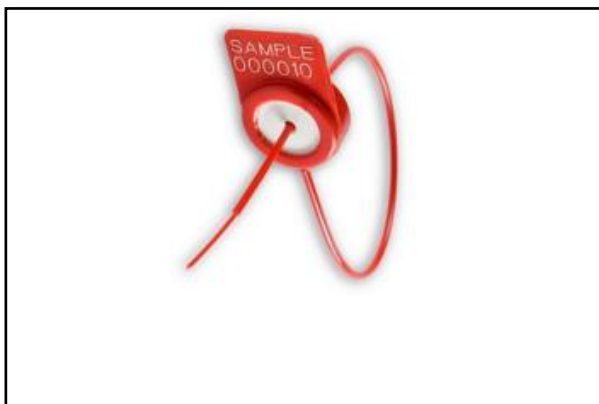
To increase cash flow, the municipality has devised various strategies such as applying for infrastructure grants and trying to decrease its wasteful expenditure of electricity. According to the IDP, the municipality applies annually for funding from the Department of Mineral Resources and Energy to keep its electricity distribution network intact (Emthanjeni Local Municipality, 2021b: 67). In 2021 the municipality received R3.6 million from the DMRE under its 'Energy Efficiency Demand Side Management' programme (EEDMS) aimed at supporting municipalities that wish to reduce their electricity consumption. The municipality has more than 3 400 streetlights, with the majority (3 100) found in De Aar (Emthanjeni Local Municipality, 2015). The municipality used the EEDMS funds to upgrade and replace the streetlights in De Aar with LED lights. The municipality's Facebook page stated that they would receive more funding over the next two years to replace the streetlights in Hanover and Britstown (Emthanjeni Local Municipality Facebook page, 2021c, 15 July).

In 2021 the municipality received some R489 000 from the Integrated National Electrification programme (INEP) to assist with its electricity infrastructure maintenance and supply. It also borrowed a capital sum of R13 million to upgrade an electricity transformer in De Aar East which they described as in dire need of an upgrade to cope with the increased demand which was causing frequent blackouts. However, indicative of its financial problems, the IDP for 2021/2022 allocated a mere R30 million to improve electricity service delivery, in stark contrast with the allocations for the previous two years, which stood at R84 995 million and R79 149 million respectively (Emthanjeni Municipality, 2021b:64).

#### 5.4.3 Illegal connections and new prepaid metres

According to the IDP (Emthanjeni Municipality, 2021b: 71) a major reason for its electricity line losses is because of illegally 'bridged' metres, which allow consumers to bypass the metre and receive electricity for free. As part of its strategy to clamp down on illegal connections, new prepaid metres with special LGM seals are being installed (shown in Figure 5.13) and a metre controller has been appointed within the municipality.

Figure 5.13: Picture of an LGM type seal used to seal prepaid electricity metres



Source: Lima: <http://limamuhurleri.com/Urun/50/LGM-570-Pull-up-Seal.html?Lang=EN>

The LGM seal has a unique serial number imprinted on it and cannot be removed without being damaged. The seal, while easily removed, acts as a psychosocial deterrent to tampering as a replacement seal has to be applied for and it would be obvious to authorities when a metre has been meddled with. The municipality has also stated in their IDP that they will start with a campaign against illegal electricity connections by June 2022. The mayor will run the project. No further details were provided regarding the campaign and what it could entail.

The metre controller position was advertised as vacant in 2021. The metre controller is expected to audit electricity pre-paid metres regularly, check their condition and verify that the cables running from the main line to the house are in working order. According to an official working on infrastructure, the COVID-19 pandemic and subsequent lockdown period made it impossible for the metre controller to carry out the required inspections:

*As gevolg van die lockdown, kon hy nie loop nie. En nou is 'n helse problem. Ek het nou die dag vir hom gevra sal jy inenting vat...as as ons vir jou 'n inenting beskikbaar kan kry want ons wil graag hê jy moet loop. Hy is bang om te loop . Ons sê ...jy kan masker dra beperk jou kontak met met mense in die huis ... dit gaan jou nie lank neem nie...10-minute op die langste neem per huis ... sover het hy nog nie ingestem vir dit nie. // Due to the lockdown, he [the metre controller] could not walk [to inspect the metres]. And now there is a hell of a problem. I asked him the other day; would you get vaccinated... if we could get you a vaccine because we want you to walk? He is afraid to walk. We say... you can wear a mask, limit your contact with people in the house... it will not take you long... 10*

minutes at most per house... so far, he has not agreed to it (Richard, interview, 21 May 2021).

Richard was frustrated as he was sure that illegal tampering with metres increased during the lockdown period between March and June 2020 and due to the metre controller not inspecting metres for over a year (May 2021).

The municipality's fine for households found tampering with a prepaid metre was set at R5 118.01 for the 2021/2022 financial year. For the 2022/2023 financial year, residents can expect to pay R5 314.85 (Emthanjeni Municipality, 2021a:387). These figures are in stark contrast to what informants in Kareeville told me they were charged. One resident in Kareeville stated that he merely had to pay R1 000 for a previously bypassed metre to be reinstated. I cannot explain the discrepancy except by assuming either a private arrangement was made between the resident and the local municipality, or this was a case of corruption.

#### 5.4.4 Solar water geyser procurement and roll-out

Since 2017, the municipality's Department of Infrastructure has been vocal about its application to the DMRE and Central Energy Fund for solar water geysers in terms of the joint social programme between these two bodies to install 87 000 solar water geysers in low-income households in 19 municipalities. These geysers would enable indigent households to heat water at no extra cost. As will be discussed in Chapter Six, only two Kareeville households that I surveyed have electrical geysers and the rest make use of an electric kettle to heat water for bathing, laundry and washing dishes. Solar geysers would, therefore, offer them much-needed relief.

According to one official I interviewed, the municipality was expecting to receive 4 000 solar home systems in 2021. The solar water geyser rollout in De Aar was likely to target the township of Nonzwakazi first (Emthanjeni Municipality, 2021b:123). However, fewer than 2 000 households in the municipality qualify to have them installed because of the prevalence of asbestos roofs in its low-income neighbourhoods, including Kareeville. In the 1970's South Africa was the third largest exporter of asbestos (Phillips, Swanepoel and Rees, 2016). Asbestos is fire resistant, strong, durable and provides decent insulation but as early as 1926, the health risks of exposure to the mineral's fibres and dust was

known (Simson, 1928:885). The Northern Cape has the highest prevalence rate of lung cancer related to asbestos exposure (Selby, 2022).

Due to the health risks and mounting pressure internationally, South Africa banned the mining and use of asbestos products in 2008 (Phillips et al. 2016). but remedial action to remove it from public housing has been slow. Regulations published in 2020 (Government Gazette 43893, 2020), specify that only type-3 registered asbestos contractors may work with the disposal of asbestos. These stringent regulations have hampered the Emthanjeni Local Municipality's solar geyser rollout plans. According to an official working in the technical services department of the municipality:

*Die beneficiaries is grotendeels behoeftige mense. Daar is 'n criteria waarvolgens die begunstigdes aangewys word...en dan die ander een is die geskiktheid van die woonhuise. Een aspek is byvoorbeeld asbesdakke kwalifiseer nie. // The beneficiaries for the most part are people in need. There are criteria according to which the beneficiaries are nominated... and the other one is the suitability of the dwellings. For example, one aspect is asbestos roofs do not qualify [for solar water geysers] (Richard, interview, May 2021).*

The 2021/2022 IDP (Emthanjeni Municipality, 2021b) reported that eradicating asbestos roofs in Britstown, De Aar and Hanover was a priority, but the municipality did not have the funds to replace the asbestos roofs that needed to be done first. Richard also stated that they were planning to train unemployed local people to fit the solar water geysers. He envisioned a more permanent form of employment for the trainees as the solar water geysers would require servicing and maintenance.

In my survey in Kareeville respondents were asked if they would want a solar water geyser fitted on their houses. Most respondents stated that they would appreciate this although respondents from two households were more sceptical, stating that they would only allow this after the municipality had conducted the necessary tests for radiation and efficiency. These two residents feared that the municipality would be 'dumping' another technology on them without explaining to the community how it works. They were also concerned about the heavy thunderstorms that De Aar experiences and how that might impact the solar water geysers as they believed they would be damaged quickly.

An interesting perspective on the issue of solar water geysers came from Cobus, a former official in the municipality. He was concerned that the municipality's electricity infrastructure could not accommodate the ever-increasing load from De Aar West, the more middle-class and formerly 'white' part of town (interview, October 2017). He therefore proposed that the geysers should be given to households in De Aar West, to take the pressure off the municipality's infrastructure during peak load times. What he failed to address, however, is the importance of the revenue the sale of electricity to residents in De Aar West generates for the municipality.

#### 5.4.5 Eskom debt and planned outages in De Aar

As noted earlier in the chapter, the municipality cannot afford to upgrade its infrastructure, but this is not its only challenge. It also cannot afford to pay Eskom the amount it owes for the electricity it purchases from the national grid. According to an Eskom media notice of June 2018, at that stage the municipality owed Eskom more than R29 million (Eskom Media Notice, June 2018). This figure had more than tripled to R90.5 million by 2021 (Beangstrom, 2020) and by March 31, 2022, the municipality's debt to Eskom was over R105 million (Eskom Media Notice, April 2022). In this time the municipality assured the public on its social media platforms that they were working with Eskom to negotiate a payment plan to avert the interruption.

One of Eskom's strategies for dealing with municipalities' failure to pay for their bulk electricity purchases is to threaten them with interruptions to their electricity supply. There were several such threats in the Emthanjeni municipality throughout my fieldwork, as shown in Table 5.4 below which depicts the dates when Eskom issued notices of electricity interruption to the Emthanjeni Municipality between March 2018 and October 2020.

Table 5.4: Dates of notices of interruption of Eskom's bulk supply of electricity to the Emthanjeni Municipality, 2018 – 2020

<b>Planned interruption dates</b>	<b>Total proposed hours of interruption</b>
16 March 2018	6 hours and 30 minutes
2 May 2018	6 hours and 30 minutes
27 June 2018	4 hours and 30 minutes
3 March 2020	14 hours a day
7 October 2020	14 hours a day

In most instances, the municipality responded by negotiating a debt payment plan with Eskom. However, in late 2020, the municipality failed to adhere to the payment plan and Eskom once again threatened to interrupt its electricity supply. According to the then Chief Financial Officer, Mr. Faried Manual, Eskom had already threatened to discontinue the municipality's energy supply earlier in the year (Emthanjeni Local Municipality, Facebook, 19 May 2021). Finally, on October 7, 2020, it followed through on its threat and the municipality experienced 12 hours without electricity, from 6 a.m. to 8 p.m. This continued for two days before an agreement was reached with Eskom and supply was reinstated. This interruption also affected the provision of water to residents as the municipal boreholes require electricity to pump water to residential areas. (See Appendix 19.)

As I was in De Aar when the news broke of the first electricity interruption scheduled for April 2018, I contacted a municipal official to interview him about it. At the time the Emthanjeni Municipality had responded to Eskom's notice of interruption of service by urging all residents to settle their municipal accounts immediately if they wished to continue receiving electricity; according to the municipality residents owed them approximately R190 million for municipal services (Emthanjeni Municipality notice, 2018). Despite the size of the debt, the official I spoke to said that the notice of interruption of supply came as a shock: *'Persoonlik, ja ek was geskok want ek het nog nie gedink dit gaan so nie. Dit affekteer die prepaid metet mense ook, jou indigent households // Personally, yes, I was shocked because I never thought it would go that way. It also affects the prepaid metre people, your indigent households'* (Cobus, municipal official, interview, April 2018). The residents of De Aar reiterated Cobus's sense of shock on the municipality's social media platform and within a few days their comments turned towards criticism of the municipality. They described the situation as confusing as two-thirds of them were paying for electricity via their prepaid metres before they used it.

These concerns were finally addressed at the community budget meeting held virtually on Facebook in May 2021 (already mentioned in section 5.3.4). At this event the Chief Financial Officer reported on payment arrangements with Eskom. He noted that the municipality is expected to honour its payments to service providers such as Eskom within 30-days of receiving the invoice, but this is not always possible due to the municipality's lack of cash reserves (Emthanjeni Local Municipality, Facebook, 19 May 2021). This he blamed on residents' non-payment of their services and taxes, with consumers taking as much as 120 days to pay for their services. Managing cash flow under these circumstances becomes near impossible. According to the Chief Financial Officer the



financial arrangement with Eskom is unsustainable because of local residents' continued non-payment for services but all the parties could do was negotiate a payment plan.

In this case the plan called for the municipality to pay its full billed amount to Eskom each month and to make an additional instalment of R500 000 per month except in the months of March, July, and November when the municipality must pay both the current account and an instalment of R5.5 million towards reducing their debt with Eskom. In March 2021, the municipality's owed Eskom R5.2 million for current purchases of electricity plus the instalment of R5.5 million, resulting in a R10.7 million payment to Eskom which it was struggling to meet. The Chief Financial Officer also pointed out that whereas the municipality charges its residents a fixed rate for electricity, Eskom has two different tariffs to the municipality for summer and winter, with the winter tariff being considerably higher (Emthanjeni Local Municipality, Facebook, 19 May 2021).

#### 5.4.6 Renewable energy service tariffs and farm revaluations

A further response to the municipality's challenges in servicing its Eskom debt has been to look to the renewable energy sector as an additional source of revenue via 'augmented tariffs' for rates and services. In 2021 the local municipality decided to place additional rates on the farm owners leasing their land to solar and wind farms as a strategy to acquire additional and much-needed funds.

Renewable energy plants have lease agreements with farmers. These lease agreements are for 20 years. The rental is calculated according to the electricity generated and sold to Eskom, with a percentage of the IPP's income from sales to Eskom paid to the farmer (Gerhard, farmer, interview, May 2021). According to one farmer, if the few wind turbines he has on his farm do not generate electricity in a particular month, he will not receive any rental for that month (Gerhard, interview, May 2021). In the case of wind farms, the farmers can continue to farm around the wind turbines but on a solar farm, the farmers' grazing land is drastically reduced, as is their stock.

As mentioned, in 2021, the municipality announced a new renewable energy service tariff, also known as augmentation fees which they have passed. The service tariffs were intended to cover the costs to the municipality to provide and /or upgrade present and future bulk infrastructure to accommodate new developments. The municipality's plan was to charge a once-off fee to the developer to upgrade or maintain the municipality's

infrastructure. In Table 5.5 the augmentation fees for both solar farms and wind farms are shown as set out by the Emthanjeni Local Municipality. According to the municipality, the farmer is responsible for the fee as they are the property owners; however, all three farmers interviewed stated that they had specifically drawn up contracts with the IPP stipulating that they were exempt from paying any additional taxation or rates and therefore would not be paying the amount owed. According to one of the farmers I interviewed (Jaco, Interview, April 2021), the municipality and the IPPs are waiting for a court date to resolve the issue of land values and property rates.

Table 5.5: Emthanjeni Local Municipality renewable energy augmentation contributions in Rands

<b>Augmentation contributions in Rand (R) to the ELM</b>			
<b>Once off wind turbines augmentation fees</b>			
<b>Services</b>	<b>Financial year</b>		
	2020/2021	2021/2022	2022/2023
Electricity augmentation fees	14 504.48	15 374.75	16 297.23
Roads and Stormwater augmentation fees	5 477.10	5 805.72	6 154.06
Refuse augmentation fees	3 201.82	3 393.93	3 597.57
Sewerage augmentation fees	26 015.29	27 576.21	29 230.78
Water augmentation fees	25 341.54	26 862.03	28 473.75
Per turbine fee	8 428.50	8 934.21	9 470.26
Any structure additional to turbine: 11 - 20 m <sup>2</sup>	1 284.67	1 361.75	1 443.45
Each additional 10m <sup>2</sup> or part thereof up to 3000m <sup>2</sup>	244.70	259.38	274.94
Greater than 3001m <sup>2</sup> per 500m <sup>2</sup> or part thereof	516.59	547.58	580.44
<b>Once off solar panels augmentation fees</b>			
Electricity augmentation fees	14 504.48	15 374.75	16 297.23
Roads and Stormwater augmentation fees	5 477.10	5 805.72	6 154.06
Refuse augmentation fees	3 201.82	3 393.93	3 597.57
Sewerage augmentation fees	26 015.29	27 576.21	29 230.78
Water augmentation fees	25 341.54	26 862.03	28 473.75
Every m <sup>2</sup> of a solar panel constructed	33.99	36.03	38.19

Source: Emthanjeni Local Municipality Bylaw 2022

Jaco, one of the farmers I interviewed, brought up the issue of increased property rates (interview, April 2021). According to him, the municipality had increased his rates considerably since he had entered his lease agreement with the wind IPP. He stated that he did not mind paying the increased amount but did not trust the municipality and wanted

to pay the money directly to Eskom and thereby help decrease the municipality's electricity debt. He would then send a proof of payment notice to the municipality. He also mentioned that he buys his electricity directly from Eskom, not the municipality, and spoke of being tired of being blamed as a 'white farmer' for the municipality's failures.

Another of the farmers I interviewed, Gerhard, was also upset by his increased rates, as a result of the increase in land value of his farm, as a result of his lease agreement with Longyuan Mulilo (which he entered into in 2007 however it only came into effect in 2017<sup>34</sup>). He is a sheep and cattle farmer with 28 wind turbines on his property. According to him, he used to pay approximately R6 200 per year to the municipality in rates but in 2020 he received a new property valuation and a rates bill for approximately R270 000 per year<sup>35</sup> – an amount which he says the municipality could not explain how it was calculated (interview, May 2021). What upset Gerhard even more was that the municipality was also charging back payments from 2017, when the wind turbines became operational. His rates bill was, therefore, over R1 million for the four years since the wind farm had become operational. He referred to the moment when he received his bill as a 'bombshell' moment that also caused massive confusion for the renewable energy companies. This is because his contract with Longyuan Mulilo stipulates that the company and not the property owner must pay any additional taxes owing. However, as the municipal account remains in his name, he is listed as owing the municipality money.

A further point of confusion among farmers leasing land to the IPPs is that the revised value of the farm is being calculated according to the size of the property, not the scale of the renewable energy infrastructure on it. Gerhard's farm is 2 000 hectares, and he has 28 wind turbines on it. His neighbour's farm is also 2 000 hectares, but he has only two wind turbines on his farm. Yet he also received a bill for R270 000 (interview, May 2021). According to Gerhard, the service tariffs issue might lead to fewer IPPs wanting to invest in the Emthanjeni Local Municipality. According to him the neighbouring local municipality, Renosterberg, was not charging farmers, with wind turbines on their farms, additional rates. This was confirmed in my interview with a farmer in Philipstown, Renosterberg Municipality (Stefan, interview, May 2021).

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<sup>34</sup> Once the IPP had reached its commercial operation date.

<sup>35</sup> I was able to verify the amounts as I had seen the new property valuation and rates bill.

## 5.5 The municipality's relationship with IPPs

This section presents findings from my in-depth interviews with municipal officials and NGO staff in De Aar on their general perceptions of what the IPPs have brought to De Aar, Specifics of the SED and ED programmes of the IPP's are discussed in Chapter Eight.

### 5.5.1 Views from municipal officials

The announcement of the REIPPP programme was met with initial optimism by local stakeholders in the municipality and NGO sector, which continued during the construction phase of the projects. In May 2017, the then mayor of the Emthanjeni Municipality, Counsellor Sthonga, wrote in his foreword to the municipality's IDP about the benefits for the municipality:

As part of National Development Plan, our municipality could be a centre of renewable energy ...these projects will also need maintenance, and maybe the supply of its material will be manufactured locally...The Municipality is convinced that the Renewable Energy projects... would grow the economy enormously (Emthanjeni Local Municipality, 2017:10, 48).

At this stage the construction of four out of the six IPPs in the municipality had just concluded. However, in the draft version of the IDP (released in March 2017) the mayor adopted a more negative tone:

Our municipality presents itself with five Renewable Energy Companies in Emthanjeni, but still, nothing had been done as per the community expectation ... their programmes...[do] not align to our IDP. The municipality had started [a] process of engaging [with] them in responding to [the] community[s] needs ... .

He referred to a Development Forum platform that was being created for 'both the IPPs and the municipality to begin recognising each other, plan together, acknowledge our entrepreneurs and SMMEs [and] not [make use of] using outside companies for their Socio-Economic Development (SED) and Enterprise Development (ED) programmes as if there's no capacity within the municipality' (Emthanjeni Local Municipality, draft version,

2017). However, he also complained that 'Some of the IPPs refuse to participate in this forum even when invited there is constant no-attendance. The municipality is persisting trying to use the Development Forum as the key platform of engagement for planning and cooperation' (Emthanjeni Local Municipality, draft version, 2017).

Similar frustrations were reiterated by officials in various departments whom I encountered during my fieldwork. According to Cobus the IPPs followed 'their own rules' and tried to bypass the municipality regarding investment in the community. Cobus was critical of the way the REIPPPP was designed, with the electricity the IPPs generated going straight to Eskom. This meant they did not have to interact with local municipalities:

No, the thing was signed, the contract, up there nationally so regionally and provincially we got no say, nothing no say. We just see these people coming here to apply for land and that's it and then they are contracted to Eskom...not even the ones on our own land, they supply to Eskom, not us. We are sitting with a hell of a problem. That's why these municipalities, they can't cope. We spoke to NERSA but...our voice doesn't carry (interview, October 2017).

Here Cobus was pointing to the top-down way in which the national government conceptualised the REIPPPP. From the perspective of local communities, the failure to integrate local municipalities as core stakeholders was a missed opportunity and flaw in the design.

Daniel, another municipal official, also noted how the IPPs "operate on their own and they make empty promises" (Interview, October 2017). He complained of not being allowed to attend a meeting with the IPPs as these were restricted to 'top management.' The IDP officer of the municipality also spoke about the lack of communication with the renewable energy companies and how they undermined him by preferring to speak to the mayor: '*Hulle luister nou nie na my nie, maar as die burgermeester iets vir hulle sê dan luister hulle, ja.*' [They] do not listen to me, but if the mayor says something to them then yes, they listen' (interview, April 2018). He was also frustrated by the IPPs failure to respond to the municipality's request for meetings and joint roundtable discussions. However, while he was critical of the company's attitude towards the municipality, he was pleased that they had begun focusing on SMMEs in the town and saw this as progress that the municipality desperately needed (interview, April 2018).

Justin, a municipal official responsible for administration and economic development, also agreed that communication between the IPPs and municipality was lacking but was more sympathetic to the context in which the companies were operating:

We do have relations with them... may not necessarily be totally satisfied but maybe they also may not be satisfied [with us]. There are needs what we think at the municipality they could have helped us, but they are also bound in terms of the IPP office at the national [level]. So sometimes when they obviously can help but [don't] in terms of their regulations or guidelines [because] they are not supposed to partner [with us]. But there are things they do for the communities in De Aar and not necessarily for the municipality (interview, June 2020).

All the officials I was able to speak to confirmed that the renewable energy companies operating in the municipality are answerable to national entities such as Eskom, national government departments such as the Department of Minerals and Energy, and the IPP office. They are not required to build relationships with the local municipality to conduct their business and because it is not mandated, building such a relationship is not a priority.

### 5.5.2 The view from an IPP employee

The difficulties I encountered in interviewing representatives of the IPPs operating around De Aar have been noted in Chapter Two. However, one of the renewable energy employees I was able to speak to, Patrick, confirmed that communication between his renewable energy company and the local municipality was poor but was critical of the part played by the municipalities in this:

*Daar was al verskeie attempts van die verskillende oorde wat probeer het om forums te begin, want daar is baie mense wat besef dat ons moet, daar moet some sort of integration wees. Maar dit is nooit... [gerealiseer nie] en die ding is die trust issue, veral ek dink, onse corporates wat dit maar moeilik vind om met die munisipaliteit te werk. Dis maar regtig 'n trust issue // There have been several attempts from different stakeholders trying to start forums because there are a lot of people who realise that we must, there must be some sort of integration. But it was never ... [realised] and the thing is the trust issue, especially I think, our corporates who find it difficult to work with the municipality. It's really a trust issue (interview, April 2018).*

Patrick recognised the need for good relationships with the local municipality in order to coordinate the planning around development projects and canvass ideas around social upliftment projects. However, according to him company boards did not trust local municipalities and preferred their staff to work independently. This was because the 'corporates', 'suit and tie people', are concerned with the financial viability of their projects and do not see the value in working with local government. They are also cognisant of the poor governance record of local municipalities with regard to corruption and financial management. He also identified a further difficulty with regard to the local economic development commitments of the IPPs: the inability of the renewable energy companies operating in the municipality to work together among themselves and coordinate their SED and ED commitments was a major problem. This is an important point which is discussed further in Chapter Eight.

## **5.6 Conclusion**

This chapter has highlighted the challenges facing one local municipality in the context of the Karoo and Northern Cape as an historically marginalised space. The Emthanjeni Local Municipality is a severally constrained and financially distressed municipality that cannot adequately provide its local residents with basic services, including a secure and reliable electricity service. De Aar, a once thriving transport centre, is now struggling with electricity outages that cannot be attributed to national loadshedding alone but are the result of its failure to service its debt to Eskom. Local consumers are blamed for their failure to pay for services, but the municipality faces severe internal challenges regarding both revenue collection and the management of its funds. This has resulted in funds not being allocated to much-needed maintenance and upgrading of municipal infrastructure. The unstable electricity system that results affects poor households that are connected to the electricity grid via prepaid metres even though they cannot be in arrears for the electricity they use. The Emthanjeni Local Municipality is resorting to various strategies to try to secure revenue, including charging local farmers and/or renewable energy companies augmentation fees that could impact on the further rollout of the REIPPPP in the area. This is not improving communication between the local municipality and the IPPs in its area which is poor.

Household energy poverty in De Aar needs to be understood in the context of these complexities. It cannot be framed only in terms of national developments and policies but has to be understood also in relation to local dynamics, including weak local government.



## Chapter Six: Socio-economic Conditions and Energy Usage in Kareeville

This chapter presents findings based mainly on the household survey that I administered to Kareeville in October 2017. The survey was designed primarily to establish socio-economic conditions and elicit information about energy consumption and energy-related issues at the household level. My discussion is divided into four sections. The first section sets the scene, with a general overview of conditions in the neighbourhood. The second section presents the socio-economic data I collected while the third section discusses energy issues. The last section unpacks the views of the residents regarding the IPPs in De Aar. In Chapter Seven I build on this discussion with findings from the in-depth semi-structured interviews I did with participants in selected households in April 2018 around how they are managing household energy needs.

### 6.1 Setting the scene

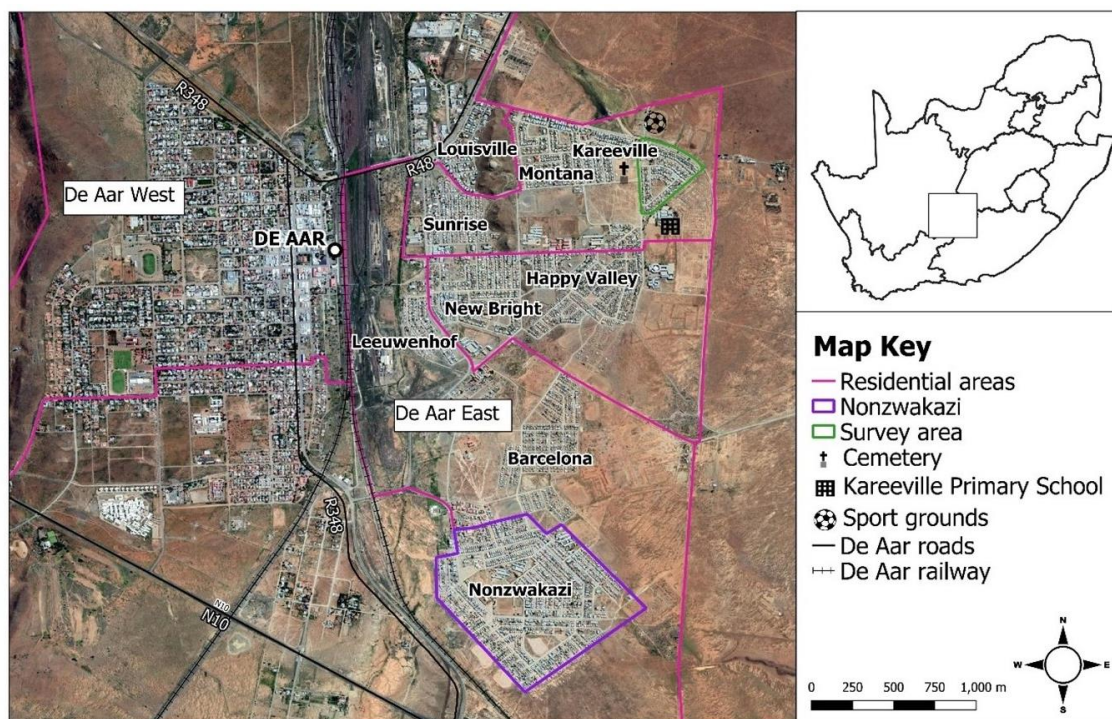
I had already driven through Kareeville on several occasions during my two scoping trips in June and September of 2017 but my real introduction to it as my research site came on 24 October 2017 at the start of my household survey. On that day I set out for it early from the place where I was staying (in De Aar West) in the company of John, a key informant who worked as a pool cleaner at the accommodation where I was staying. He had once lived in Kareeville with his niece and her children. After making some money as a gardener at a local bed-and-breakfast establishment, he had moved from his niece's home to an RDP housing project known locally as *Vuurhoutjieland* [Matchbox-land] because of the smallness of the houses and the plots on which they were erected.

On our way to Kareeville, John and I drove through various sections of De Aar. Once again, I was astounded by his knowledge of the town; I had earlier met with two municipal officials who could barely recall all the residential areas although they appeared eager to assist me. John had helped me in my decision to choose Kareeville as my case study site and made a point of warning me to avoid the neighbourhoods of Barcelona and Macarena in De Aar East because '*Dis gevaarlik vir iemand soos jy*' [It is dangerous for somebody

like your]. I never pushed him on whether he was referring to my skin colour, gender, or age, or to all three.

We drove away from the town's CBD, through a dimly lit underpass<sup>36</sup> that runs under the railway tracks separating De Aar West from De Aar East and past the motor vehicle testing facility till we reached the sign which welcomes travellers entering De Aar from the east. There we turned right onto a road that was still tarred but in poor condition. This road passes the more affluent area of Louisville and the low-income area of Montana and finally reaches Kareeville. The tarred road ceases at the crossroads between Montana and Kareeville. All that is left after that is an uneven dirt road and piles of rubbish lying around (see figure 6.2). On the morning when John took me to the township, cows were wandering in the road, nibbling at the litter (see Appendix 22).

Figure 6.1: Residential areas in De Aar



Source: SARChI chair in the Sociology of Land, Environment and Sustainable Development, 2021

<sup>36</sup> See appendix 21 for a photograph of the underpass.

John took me to his niece, who lived opposite Kareeville Primary School, she was welcoming and suggested that I should park my car behind her house where it could not be seen from the road. She and John explained that my university car was 'fancy' and could raise suspicions and draw unnecessary attention. I accepted her offer and left my car there for the first week.

As already described in Chapter One, Kareeville is one of the older black neighbourhoods' areas in De Aar, dating back to the imposition of the Group Areas Act in 1965. According to Marais (1977:22-23), in 1962 the council in De Aar started with a housing programme, building 765 houses in the designated 'coloured' group area, in the area encompassing present-day Barcelona, Nonzwakazi and parts of Leeuwenhof. (See Figure 6.1.) These houses were, however, not given to people classified as 'coloured' but to 'Bantu' people who would today be described as 'black' African, a move which caused an uproar in the town as the 'coloured' group was in the majority. In the 1970s further sub-economic houses were built in what was called Extension 7. Kareeville, Extension 10, was subsequently built in 1977 with 292 sub-economic units (*Diamond Fields Advertiser*, 1977).

Today Kareeville remains a predominantly 'coloured' residential area. It is rundown, with only one tarred road in front of the primary school (Alpha Road), a few scattered streetlights (not all functional), and litter dispersed across the open *veld* and sticking to the fences between the houses (Figure 6.2).

Figure 6.2: Kareeville viewed from the sports grounds, 2018



Photographed by Stephanie Borchardt, April 2018

To me the open veld next to Kareeville looked like a dump. According to a local informant, the municipality dumps rubbish bags there on purpose, to deter people from claiming the land and building informal houses on it (Kareeville resident, interview, April 2018). The sports field is not maintained either (see figure 6.3).

Figure 6.3: The overgrown sports field in Kareeville, 2018



Photographed by Stephanie Borchardt, April 2018

Most houses have four rooms (two bedrooms, a kitchen and a living room), with old, asbestos roofs and one outside tap per property (Abraham, interview, May 2021). According to a municipal official in the community service department, the houses in Kareeville are standard 40 square to 50-square-metre homes. (See figure 6.4 for an example of the exterior of a typical house.) As noted in Chapter Five, the asbestos roofs mean that solar geysers cannot be installed in this area because the roofs have first to be replaced and the municipality does not have the funds to employ a qualified contractor to do so. Thirty percent of the households in my survey, the more affluent ones, have laid waterlines from the outside taps on their property to a tap inside their houses. All houses were built with outside flush toilets but 28% of the households in my survey have also moved their toilets inside.<sup>37</sup>

Figure 6.4: A typical house in Kareeville, 2017



Photographed by Stephanie Borchardt, November 2017

In Kareeville one feels one is on the very outskirts of the town. It is blocked off from the CBD by the dilapidated station buildings and overgrown railway tracks separating De Aar East from De Aar West. The underpass, the primary route to town, is often flooded after

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<sup>37</sup> These 14 homes would then be the ones in the survey with a bathroom inside their house.

heavy rains, blocking off the road access to the CBD. Residents with whom I spoke complained that the taxi service in De Aar is very expensive. According to Cherise:

*Dorp toe is R30. Daai hospital wat so ver sit daar, elkeen het sy prys. Een vra R40, een vra R50, ander vra R60. Waar kry jy R120 vir die dag? // [Transport] to town costs R30. The [new] hospital that is located so far away, every person has their own price. One will ask you for R40, one will ask you for R50 and another will ask you for R60. Where do you get R120 to pay for a return ride for the day? (interview, 18 April 2018).*

During the course of my fieldwork in Kareeville, several participants revealed to me that they had been attacked and robbed of their belongings at the underpass, especially if they were seen carrying bags filled with shopping from the town. One resident, Bernard, told me he did not blame the people that attacked him: *'Elkeen het maar sy taktiek hoe om te survive in sulke omstandighede // Each one has their own tactic to survive in these conditions'* (interview, April 2018). According to him it was common to know your attackers as De Aar is a small town.

Those who can afford the taxi service used it sparingly. Unlike elsewhere in the country, the taxi service in De Aar seems to be in sharp decline, with the taxi rank in the centre of town converted into an informal car wash area. The lack of public transport and fears around personal safety inhibit traveling in and around town. Several people told me that they only take their children to town with them when it is 'grants-day' when they need the extra hands to help carry the shopping bags filled with the monthly supply of groceries. 'Grants-day' refers to the day when the South Africa Social Security Agency (SASSA) pays out social grants which are generally collected at the Shoprite shopping centre or the post office in the town centre. For small, daily purchases residents rely on a few neighbourhood shops in Kareeville and Montana. Electricity can be bought at these shops although many people prefer to buy their electricity at outlets in the CBD during 'grants-day'.

Kareeville has several schools all within walking distance: two primary schools, Kareeville Primary and Alpha Primary, and one high school, Orion High. The Montana clinic that operates five days a week is some 500 metres from the centre of Kareeville, but the nearest hospital is much further away (approximately six kilometres). Given the cost of a taxi to get there, a few Kareeville residents mentioned that they thought the hospital was badly placed. There is also one church, the *Olyfboom Pastorie Sending* [The olive tree

mission] in a large brick house. The map of the area that I was given by the Emthanjeni Local Municipality shows an old age home, park and crèche but the site where these building should have been located is empty, strewn with litter and scraps of building material. Here, I would regularly see dogs sniffing through the rubbish and barking at passers-by.

## 6.2 Socio-economic conditions

### 6.2.1 Demographics

Table 6.1 below compares demographic and other data on Kareeville collected through my household survey with the data on De Aar from the 2011 National Census (Statistics South Africa, 2011a). (Note that unless otherwise stated all data presented on Kareeville comes from the household survey I conducted in 2017). According to the household survey, Kareeville has a higher percentage of young people (0-14 years old) at 36.4%, compared to the town of De Aar overall, at 32%. Kareeville also has a lower percentage of residents aged 20 and older with matric (21.5%) and tertiary qualifications<sup>38</sup> (3.8%) than De Aar overall. In Kareeville more women (4.5%) had no formal education and could neither read nor write compared to men in Kareeville (0.7%); however, comparing the highest level of educational attainment by gender indicated that men<sup>39</sup> and women<sup>40</sup> had the same median<sup>41</sup> which meant that for most adults the highest level of educational attainment was grade 9/ Std 7.

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<sup>38</sup> Tertiary qualifications include diplomas, certificates, and university degrees.

<sup>39</sup> Mean is Gr 7/Std 5; Standard deviation is 3.67

<sup>40</sup> Mean is Gr 8/ Std 6; Standard deviation is 3.51

<sup>41</sup> The median is used as the standard deviation is larger than 1. The mean is therefore affected by outliers and the median is used as the average.

Table 6.1: Comparison of demographic profile and services, De Aar and Kareeville

	De Aar (2011) <sup>42</sup>	Kareeville (2017)
Gender distribution	Male 49,1% Female 50,9%	Male 46.6% Female 53,4%
Number of households	(census) 5,356	(survey) 50
Average household size	4,3	6.3
Children (0-14 years old)	32%	36.4%
Working age (15-64 years old)	62,5%	58.6%
Elderly (65+ years old)	5,5%	6%
No schooling aged 20 and older	9,5%	4.4%
Matric aged 20 and older	27,8%	21.5%
Higher education aged 20 and older	7,5%	3.8%
Flush toilet connected to sewerage on site	95,9%	100%
Piped water inside the dwelling	73,1%	30% <sup>43</sup>
Electricity for lighting	95,6%	94%

Table 6.1 also reveals a striking difference in average household size in Kareeville compared to De Aar overall. Whereas the average household size in De Aar in 2011 was 4.3 people the average size in Kareeville in 2017 was 6.3 people.<sup>44</sup> This is also larger than in the neighbouring towns of Hanover (3.9), and Britstown (4.2) (Statistics South Africa, 2011b; 2011c) and the Karoo towns of Loeriesfontein and Sutherland where household surveys found the mean household size in both these towns to be three (Vorster, 2019:4; Vorster and Eigelaar-meets, 2019:3). Residents of Kareeville complained strongly during my household survey and in-depth follow-up interviews that overcrowding in their houses is a major concern for them and they are unhappy about not being able to provide adequate shelter for family members. The government-supplied houses in De Aar are too small to provide separate bedrooms for household members and most children must sleep on the floor. The largest household recorded during my survey had 15 people. (The

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<sup>42</sup> Statistics South Africa (2011a)

<sup>43</sup> Of the 50 households that were surveyed, 30% had spent their own money to bring the water from the tap located outside on the property into their homes.

<sup>44</sup> The median is 6.24, standard deviation is 3.13 and the mode is 6.



complexities associated with energy usage in large multi-generational households are unpacked further in Chapter Seven.)

De Aar has neglected its mandate to provide housing which has contributed to the overcrowding. In August 2012, the then Public Protector, Advocate Thuli Madonsela, visited De Aar on one of her inspection tours to address issues raised with her office. According to a media statement on the South African Government website (South African Government, 2012), she responded to a series of complaints at a public hearing in the town by committing her investigation team to 'give priority to urgent cases such as those of older persons who said they were still waiting for houses they applied for more than a decade ago and those whose houses had allegedly been taken away by the municipality over unpaid electricity bills'.<sup>45</sup> The media statement also noted:

Among the key concerns raised by community members at the local hall was the dilemma of house applicants who switched provinces, people in possession of allocation letters yet their houses being occupied by others, data bases that incorrectly stated that people have houses, names that disappeared from waiting lists, the small size of the houses, long waiting periods for delivery of houses and houses not built to standard (ibid),

During a follow-up trip to De Aar in May 2021, I saw some houses under construction on the field that had previously been litter strewn (figure 6.2). Figure 6.5 shows the incomplete housing project.

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<sup>45</sup> <https://www.gov.za/public-protector-take-de-aar-grievances-provincial-government-leaders>

Figure 6.5: Housing project next to Kareeville, 2021



Photographed by Stephanie Borchardt, May 2021

Two municipal officials I interviewed were however critical of the speed at which the houses were being built and the fact that some were being vandalised as the municipality had not yet moved families into the new homes (interviews, May 2021).

## 6.2. Household income in Kareeville

My survey data on household income is incomplete as just under a half of all my respondents (24) were either reluctant to provide details of income, regarding it as sensitive information, or did not have a complete picture of the income of all individual members. This was not unexpected. However, although it meant I could not make precise calculations around the proportion of household income spent on securing energy, it did not affect the designation of Kareeville as a low-income neighbourhood experiencing high levels of poverty and unemployment. What I was able to establish is that in most households several income sources are required to meet basic needs, including social grants, wages and remittances. Remittances did not feature in the survey, but several respondents mentioned it in passing. High levels of unemployment were also regularly mentioned as a major problem.

Another and arguably more reliable source of information on the extent of poverty in Kareeville is to consider the number of households in my survey who qualified for FBE. Table 6.2 shows that 34 out of the 50 households in my survey reported that they were recipients of FBE, i.e., some two thirds of my sample qualified as 'indigent' in terms of the Emthanjeni Local Municipalities criteria. As already stated, only 'indigent' households may receive the FBE which in this case applied to households earning below R4 750 per month regardless of their household size. The majority of households indicated that they had heard of the FBE policy through the municipality which had notified them that they qualified.

Table 6.2: Recipients of Free Basic Electricity (FBE)

Do you receive Free Basic Electricity (FBE)?		Percentage (%)
Yes	34	68
No	15	30
Don't know	1	2

The various social grants that these households receive can be seen in table 6.3.<sup>46</sup> As can be seen in the table, over a third (37.4%) of all residents (not households) were reported to be receiving social grants. The most important grant was the child support grant which counted for close on three quarters of all grants received (72.6%).

Table 6.3: Kareeville residents' reported access to social grants

Grant	Responses	Frequency	Percentage (%)
Access to Social grants	Yes	117	37.4
	No	196	62.6
Types of social grants that residents' access	Child support grant	85	72.6
	Old pension grant / Veteran grant	22	18.8

<sup>46</sup> The survey was conducted in October 2017 when individual grants per month were set as follows: the old age (for those over the age of 60 years), disability and care dependency grants: R1600; the child support grant: R380; the foster care grant: R920, and the old age pension grant for individuals older than 75 years: R1620. Source: <https://www.iol.co.za/business-report/budget/budget2018-watch-pensioners-will-only-get-a-r90-increase-13404214> [Accessed: 17 April 2018].

	Disability grant (Adult)	9	7.7
	Disability grant (child)	1	.9
	Total	117	100

Table 6.4 depicts the survey findings on employment in Kareeville (N=147). The survey questions relating to employment were restricted to economically active individuals aged 15 years and older. Household members who were older than 15 and not working because they were 1) students/still in school (N=49), 2) pensioners (65 and older) (N=20), and 3) physically disabled and unable to work (N=5), were excluded from the analysis.<sup>47</sup> This left a total of 147 individuals of whom only 79, i.e. 53.7%, were in employment. The majority of those employed were in low- or semi-skilled work as domestic workers and general workers. The two most common jobs reported were general worker and domestic worker, both very low-paid. Only a handful of people had what could be considered middle-class jobs (some teachers, an attorney). While most were working on a full-time basis, for one employer, approaching a third (31.6%) were employed part-time or seasonally, including many of the general and domestic workers, as well as the artisans. The state sector accounted for approaching a quarter of all reported jobs.

Table 6.4: Employment of Kareeville residents by type, sector and occupation

Survey Question	Coded survey responses	N	%
Are you currently employed?	Yes	79	53.7
	No	68	46.3
	<b>Total</b>	<b>147</b>	<b>100</b>
If yes, is your current occupation ...	Full-time (worker for one employer)	50	63.3
	Part-time (odd jobs)	25	31.6
	Seasonal worker	3	3.8
	Other	1	1.3
	<b>Total</b>	<b>79</b>	<b>100</b>
In which sector are you employed?	For private individual	22	27.8
	Private sector	20	25.3

<sup>47</sup> In South Africa, the economically active population is defined as the total number of people between the ages of 15 and 64 who are willing and able to work. People who are regarded as not able to work, i.e not economically active, include those who are full-time students, 'homemaker' and retirees (Statistics South Africa, 2013).

	Informal sector	19	24.1
	Municipality	6	7.6
	State: police, justice	5	6.3
	State: Education	4	5.1
	State: EPWP/ CWP	3	3.8
	Self-employed - Formal sector	2	2.5
	<b>Total</b>	<b>79</b>	<b>100</b>
What is your main occupation (description of occupation)?	General worker, including municipal & CWP	19	24
	Home worker/ Domestic helper, gardener	15	19
	Farm worker	5	6.3
	Cashier	4	5.1
	Security guard	4	5.1
	Butcher	4	5.1
	Teacher, attorney	4	5.1
	Builder and building contractor	3	3.8
	Artisan (mechanic, electrician)	2	2.5
	Works for a farmer	2	2.5
	Police officer, army officer	2	1.3
	School classroom assistant	2	1.3
	Assistant manager-restaurant	1	1.3
	Truck driver	1	1.3
	Supervisor at an abattoir	1	1.3
	Paid intern in management administration	1	1.3
	Train conductor's assistant	1	1.3
	Carpenter	1	1.3
	Hospice assistant	1	1.3
	An assistant to a ward counsellor	1	1.3
	Mechanic assistant	1	1.3
	Assistant at an abattoir	1	1.3
	Laundrette assistant	1	1.3
Fruit marker seller	1	1.3	
Baker	1	1.3	
<b>Total</b>	<b>79</b>	<b>100</b>	

Only one resident worked for the Community Works Programme (CWP) which is very low in comparison to findings from household surveys conducted in the small towns of Loeriesfontein (Vorster, 2019) and Sutherland (Vorster & Eigelaar-Meets, 2019) where the CWP employed 12% and 13% respectively. The CWP is a national government initiative to employ people of working age on a short-term basis working 'typically 2 days a week or 8 days a month' performing community service work (CoGTA 2022; Western Cape Government, 2019).

### 6.3 Energy consumption and challenges

#### 6.3.1 Energy consumption

As previously noted, all houses in Kareeville are connected to the municipality's electricity grid. Almost all of them – over 90% (46 out of the 50 households) in my survey – are connected via prepaid metres. Only three households – those of the attorney, teacher and a domestic worker<sup>48</sup> – have accounts with Eskom (as seen in table 6.5). One household reported not having access, but this was because it had had its prepaid metre disconnected from the network, because it had been found to be bypassing the metre. While households thus have access to electricity, many rely heavily on firewood, paraffin, and gas as supplementary fuels to meet their basic needs for cooking, boiling water for washing and staying warm in the winter.

As discussed further below, buying electricity is a major burden on household budgets. The household survey included a question on monthly expenditure, the results of which are presented in Table 6.5 below. Caution needs to be exercised in interpreting this as I was unable to gather sufficient data on household income to relate these amounts to total household expenditure, while household size is an important variable in determining the extent of energy poverty. Nevertheless, the amounts are very low. In the case of the four households reporting no monthly expenditure, they took steps to ensure they used only the FBE allocation.

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<sup>48</sup> The domestic worker stated that the house belonged to her now deceased mother who had a stable job in Kimberley.

Table 6.5: Average amount spent on energy by Kareeville households (N = 50)

Monthly amount	Number of households
R0	4
R1 - R250	30
R251 - R500	7
R501 - R750	6
R751 - R1000	1
R1001 - R1250	1
Don't Know	1

Table 6.6 below presents responses to the survey question on the adequacy of households' electricity supply. The majority of respondents believed that they did not have enough electricity to fulfil their energy needs for cooking (58%), lighting (54%), heating of space (20%), and heating of water (58%).

Table 6.6: Adequacy of electricity for household needs

Is the amount of electricity you have adequate?		Frequency	Percent (%)
Cooking	Yes	21	42
	No	29	58
Lighting	Yes	23	46
	No	27	54
Heating of Space	Yes	15	30
	No	10	20
	N/A	25	50
Heating of Water	Yes	21	42
	No	29	58

Over 80% attributed this primarily to lack of funds to buy the electricity they need (as can be seen in table 6.7). One resident commented: 'We struggle through life' as electricity was not always affordable. In one of my follow-up interviews in 2018, Marie, a resident, noted: '*Jy kan nie so baie koop nie. Ek koop om te lewe*' // 'You can't buy so much [electricity at once]. I buy to survive' (interview, April 2018).

Table 6.7: Reason why electricity is inadequate to meet households needs.

Reason	Number	Percentage
Cannot afford an adequate amount of electricity.	41	82
Electricity is adequate for household needs	9	18

Whether or not residents found their electricity supply adequate, all participants were asked if their electricity was ever interrupted and if so, why. Forty-six of the 50 respondents answered this question in the affirmative, offering three reasons for electrical outages. The main one, identified by 19 respondents (38%), was that residents' experience of interrupted supply was due to municipal maintenance about which they were not notified. Twelve respondents (24%) specified that thunderstorms and strong winds caused electrical power outages in De Aar that could last for several hours while 11 (22%) stated that while they could afford electricity in summer and spring, during the winter season they struggled to afford the amount of electricity they needed and therefore their electricity supply would be interrupted. Three of the remaining four residents did not respond to the question as they believed they had an adequate supply. These three households were the ones that had an electricity account with the municipality and were not using the pre-paid electricity metre. The fourth resident had not responded to this question as he had no electricity connection. His use of other energy sources will be discussed in section 6.3.3, in relation to figure 6.9.

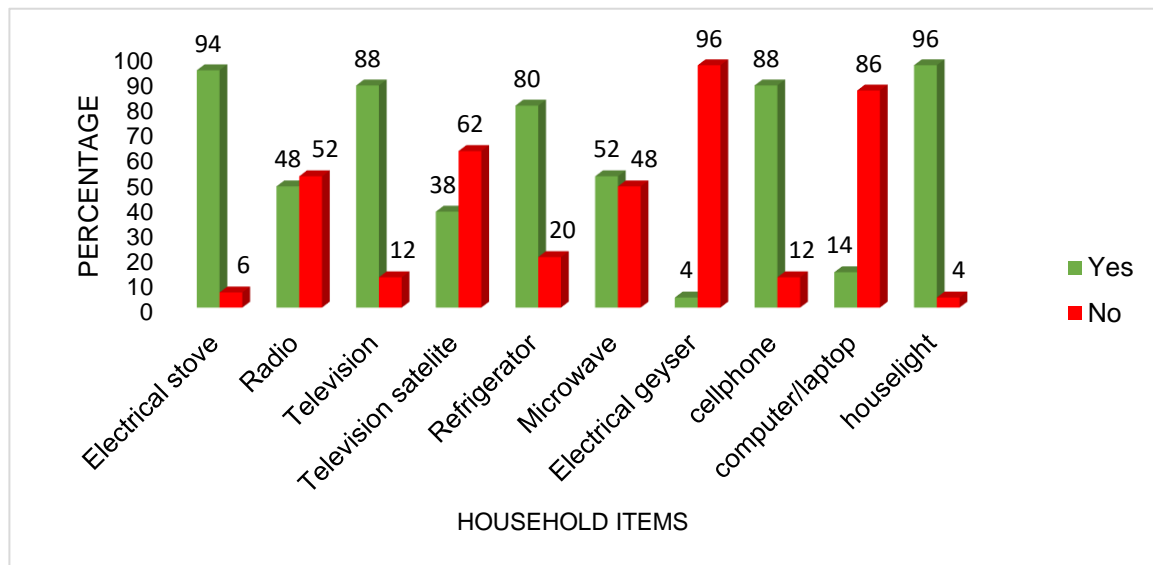
### 6.3.2 Appliances

Overall, households in Kareeville have a variety of electrical appliances but the affordability of using these appliances is the challenge. As shown in figure 6.6, household appliances such as an electrical stove, 94%; and a refrigerator, 80% appeared to be most common amongst residents. Almost all households, 88%, had a working television in their home but only 38% reported having satellite television and just under half (48%) had a radio. Notably, only two of the 50 households, both households reporting the largest monthly incomes in survey at R20,000 and R13,500 respectively, had electric geysers and none had solar geysers fitted. Heating of water, whether for bathing, washing dishes, or clothes, involved boiling a kettle several times a day. While a kettle was not a specified item on the household questionnaire, 43 households indicated that their main way to heat water is with an electric kettle. This excludes the two households that have an electrical



geyser. Of the remaining five households: two indicated heating water on a wood fire, one household indicated heating water on the electric stove, one household indicated heating water on gas stove and one household indicated that they heat water on a paraffin stove.

Figure 6.6: The household appliances and items of the Kareeville residents (N=50)



According to Lisa, one of my respondents in my follow-up interviews in 2018, '*Nee, mens kan nie met koue water skottelgoed was nie. Jy kan nie skottelgoed skoon kry nie, dis vetterig. Ek dan in ketel water gewas*' // 'No, you cannot wash dishes with cold water. You can't get dishes clean, they're greasy. I then washed in kettle water' (interview, April 2018). She also noted that she would prefer to heat water with a kettle as it was quicker but if they had run out of electricity, she would make a fire to heat water. This would also involve first collecting firewood as she does not stockpile firewood. Another resident, Bernard, also emphasised the importance of the kettle in his household which comprised 12 members, six of them children ranging in age from three to eleven years old. According to him, he would unplug the refrigerator so he could boil the kettle for hot water so the children could wash. This had to be done quickly in the morning as all the children had to get dressed and ready for school.

### 6.3.3 Sources of energy

Kareeville respondents were also requested to provide me with their primary and secondary sources of energy for cooking, heating of space, lighting, and heating of water. Table 6.8 below shows the six energy sources that were identified, in comparison with the

data on De Aar from the 2011 census data. This shows electricity to be the by far the primary source of energy. Table 6.9 shows secondary sources of energy. Firewood emerged as a very important secondary source, followed by gas, with candles important for lighting. Potential energy sources such as animal dung and agricultural waste were not reported. While electricity is the primary source of household energy, residents employ various strategies to save electricity, discussed further in the next chapter. More than 50% of participants in the survey stated that they would not waste electricity on heating space in the household as this was too expensive an undertaking.

Table 6.8: Primary energy sources in Kareeville (2017) and De Aar (2011)<sup>49</sup> (Percentage of households per activity)

Energy source	Cooking		Lighting		Heating of water <sup>50</sup>
	De Aar	Kareeville	De Aar	Kareeville	Kareeville
Electricity	92,7	92	76,5	94	90
Gas	2,4	4	2,3	2	4
Paraffin	2,4	2	4,5	/	/
Candles	0	/	4,6	4	/
Wood	2	2	0	/	4
Coal	0,2	/	0	/	/
Other	0	/	0	/	2
None	0,2	/	0,1	/	/

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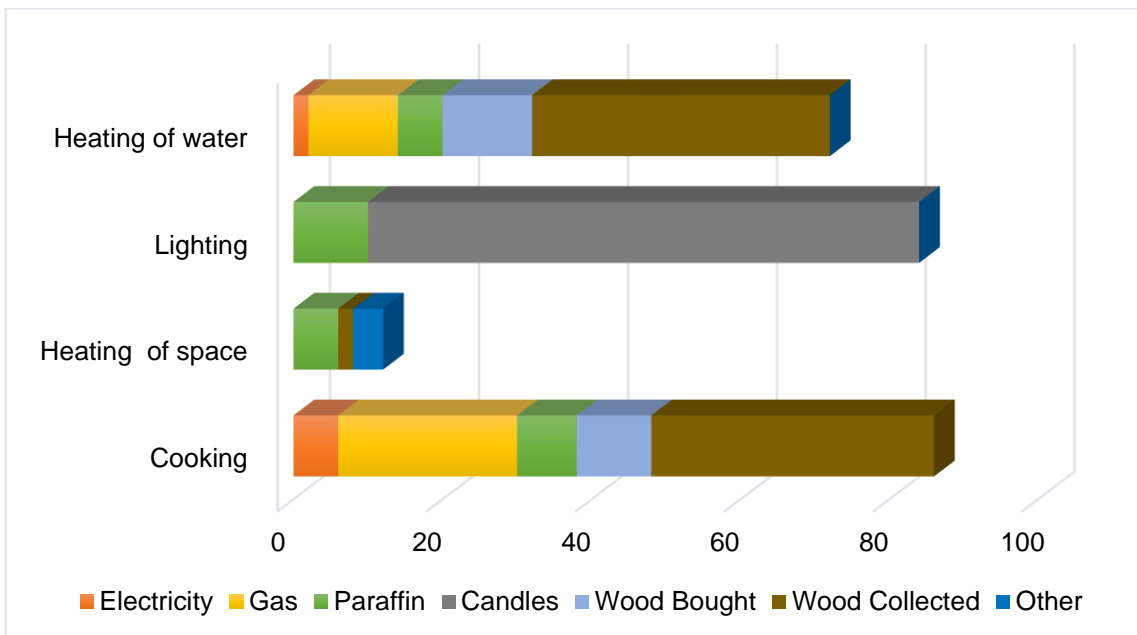
<sup>49</sup> Based on Statistics South Africa (2011) Census Data. No data on De Aar's energy sources for heating of water could be found.

Table 6.9: Secondary sources of energy in Kareeville (Percentage of households per activity)

Energy source	Cooking	Heating of space	Lighting	Heating of water
Wood: Collected	38	2	/	40
Gas	24	/	/	12
Wood: Bought	10	/	/	12
Paraffin	8	6	10	6
Candles	/	/	74	/
Electricity	6	/	/	2
Other	/	4	2	2
None	14	88	14	12

Figure 6.7 shows the relative importance of the secondary energy sources per activity graphically.

Figure 6.7: Relative importance of secondary sources of energy per activity (percentage of households per activity)



As noted in Chapter Two, in the survey I distinguished between firewood which was collected either from the *veld*, the municipal waste deposit site, or surrounding areas within

the town of De Aar, and wood bought from the nearby shops. This was because I wanted to obtain a more in-depth knowledge regarding reliance on firewood. The importance of collected firewood can be clearly seen in figure 6.7. The collection of firewood to meet energy needs, including the gendered and generational dynamics around this, will be unpacked in more detail in Chapter Seven.

The 'other' energy source for heating space in Table 6.9 refers to books and clothes. During the survey, two respondents stated that they tried to heat their houses during the winter season (May to October) by finding old books and clothes in the town's rubbish dump<sup>51</sup> or in dustbins belonging to the *Dorpsmense* ['townspeople'] and making a fire with them inside the living room. One participant stated that she would only rely on these energy resources if she could not find any wood to collect. Both residents reassured me that they knew of the dangers of an indoor fire but that the cold becomes unbearable in De Aar's winter months. During a follow-up interview, Hendrik spoke about cooking food outside when it rains. According to Hendrik, *'Ek maak hier binnekant (vuur), ander mense maak buite. Ek voel vir hulle, dis my medemens. Maar ek is hier binne. Dis maar moeilik / I make [a fire] inside [my home], other people make outside [even when it rains]. I feel for them, they are my fellow human beings. But I'm in here. It's just difficult'* (interview, April 2018). Hendrik did not have a fireplace nor a proper firepit indoors; he made the fire inside a stainless-steel drum until there were coals with which he could cook.

The 'other' response recorded for lighting was from a participant who makes use of a portable kerosene (paraffin) stove similar to the stove pictured in figure 6.8 below. He lights the paraffin stove and sets it so that the flame is on high as a source of lighting. Another resident, Bernard, indicated that he uses his portable paraffin stove to heat water when there is no more money to buy electricity. During my follow-up interview with Bernard, he revealed that they had switched entirely to heating water on the paraffin stove and no longer made use of a kettle (electricity) as it was cheaper. Bernard further noted that he usually purchased five litres of paraffin per month (interview, April 2018). The second 'other' response came from a household with six household members, two of the members are employed, one as a domestic worker and the other as a builder in the informal sector. This household indicated that they make use of clothing rags and books to burn for lighting. These items they find at the De Aar garbage disposal site.

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<sup>51</sup> For a photograph of the garbage disposal site see Appendix 23.

Figure 6.8: Photograph of a portable kerosene stove



Source: <https://www.takealot.com/portable-paraffin-stove-cooker-and-heater/PLID72690255>

The kerosene/ paraffin stove in the picture is being sold online and is priced between R300-R400 per stove and looks just like the ones I had seen in the households during my surveys. According to Kimenia and Van Niekerk (2017:290), these types of stoves are prone to failure and often do so within a few weeks of use. The list of failures include: the stove's self-extinguishing mechanisms breaks and the stoves reservoir tank leaks. (For more on the dangers such as fire and health implications of portable kerosene stoves see: Kimenia & van Niekerk, 2018; Kimenia, van Niekerk, Govender & Seedat, 2018; Webster & Bongwe, 2022; van Niekerk, Kimenia, Seedat & Annegarn, 2022.)

The open flame of the kerosene stove is hazardous as it can ignite when interacting with other fuels, or the fuel could leak, which could lead to a fire or an explosion. Burning clothes whether it is inside a house or outside poses a risk to people standing close by as the fumes and smoke caused by the burning clothes can cause respiratory issues. During the interview a resident, Luke, also spoke about creating a 'fire-drum' that he made especially during winter:

*Ek maak buite vuur dan bring ek daai kole in met 'n vuurdrom. Is so 'n 20 liter...het hom gaatjies ingekap en 'n sif ingesit...sodat [die kole] hy nie moet deurval nie...sodat die kole net kan bo bly.// I make a fire outside then I bring those coals in with a fire drum. It's about 20 litres [the steel drum] ... I cut holes in it and put a strainer in it...so that [the coals] don't have to fall through...so that the coals can only stay at the top (interview, 18 April 2018).*

Luke then puts this fire drum in the children's bedroom to heat the room<sup>52</sup>. His situation is unique as he was the only resident in my survey who had no electricity access. The municipality realised that Luke, who was previously employed as an electrician, had tampered with his electricity metre and therefore disconnected their household's electricity access.

## 6.4 Knowledge of renewable energy

Walking through the streets of Kareeville, one cannot but be aware of the wind farms that surround De Aar on the nearby flat-topped mountains. Figure 6.11 shows the view from the flat-topped mountain behind De Aar West residential area. The survey was designed with this in mind, with Section D centred on respondents' perceptions of the renewable energy companies operating around De Aar, their knowledge of renewable energy as a technology and whether they perceived any benefits of the REIPPPP visible from their back yard or their *stoep*.

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<sup>52</sup> During my initial survey, Luke and his wife lived alone however in 2018 during my interview, two children under the age of ten were living with them. Luke refused answers relating to the children, their parentage and why he had not spoken about them during the 2017 survey.

Figure 6.9 Windfarms and solar farms surrounding De Aar, 2018



Photographed by Stephanie Borchardt, April 2018

A small number of households had benefitted directly during the construction phase through employment opportunities, with seven participants in the survey (14%) reporting that at least one member of their household had been employed at a solar farm during the construction phase. One resident, Alexander, stated that he had been employed as a technical engineer assistant in 2013 by the contractor to set up the solar panels just outside of De Aar. According to him, by the end of the construction phase in 2014, only 40 people were retained as maintenance staff. Alexander further stated that many of the jobs on offer went to men and that in 2018, there were fewer than 20 people employed as maintenance staff (Interview, April 2018).

During the survey I also asked if the participant thought that the renewable energy in De Aar was contributing to their town. This question was purposely designed as an open-ended question as I wanted to capture people's own ideas on renewable energy and not propose options via closed-ended questions. About a quarter of participants, 34%, said that the REIPPPP had made no contribution to their household, 26% said that it had provided employment opportunities, and 10% said that it provided electricity. The remaining responses mentioned community development projects such as the sponsorship of sporting events and the provision of business training courses (both example of the SED programme of the IPP). A follow up question in the survey (2017) was

posed to participants regarding the REIPPPP mandates towards SED and ED. Their responses will be unpacked in Chapter Eight.

In my follow-up interviews in 2018 one interesting response that was negative about the IPPs came from Hendrik. In addition to being critical that the projects were not contributing to cheaper electricity in the town he was concerned that the wind turbines and solar panels were causing a range of health problems because of 'radiation':

*Die wind panele, ons weet nie wat is hulle se doel nie. Ons weet nie waarvoor is hulle nie. Ja, dit benefit nie vir ons nie, as die gemeenskap hier rond wat onder dit lewe nie, dit benefit vir ons niks nie. Onse krag tariewe is dieselde, hulle het gesê dit gaan 'n groot verskil maak in dit in, dit doen nie dit nie. Dis nou al so lank soos wat daai panele daar staan,..onse plantegroei is dood, onse bome, onse vrugtebome groei nie. Onse kinders is...hulle se breine is al aangetas, ek weet nie is dit die...wat noem jy dit? Radiation. Is dit radiation? Ja, wat daai ding seker maar afgee, ja. Want hy 'n soort van 'n radiasie, soos 'n...wat is hierdie goeters? Die grade van die temperatuur ook, man. Dan is dit te warm. Ons weet nie, maar ons dink dis dit...hulle wat daar onder dit werk, sien jy, voel nie daai...die spoed van die wind dink ek as hy daar is, by die tyd as daai wind hier kom dan dink ek hy behoort nou al so groot te expand het dat hy nou al die gemeenskap kan raak. Dis wat daai wind panele doen. //The wind panels,<sup>53</sup> we don't know what their purpose is. We don't know what they are [there] for. Yes, it does not benefit us, as the community around here that lives under it, it does not benefit us at all. Our electricity tariffs are the same, they said it would make a big difference in that [it reduces household electricity cost], it doesn't. It's been as long as those panels have been there... Our vegetation is dead, our trees, our fruit trees are not growing. Our children are...their brains are already affected; I don't know if it's the...what do you call it? Radiation. Is it radiation? Yes, that thing must give it away, yes. Because it's kind of a radiation, like a... what are these things? The degrees of the temperature too, man. Then it's too hot. We don't know, but we think it is...those who work under it [the wind turbines], you see, [they] don't feel that...the speed of the wind....by the time that wind comes here then I think it should have expanded*

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<sup>53</sup> Throughout the interview Hendrik referred to the wind turbines as wind panels. He was one of four other residents that used this terminology to describe the turbines.



so big by now that it can now blow away the whole community. That's what those wind panels do (Hendrik, interview, April 2018).

From the excerpt it is clear Hendrik does not understand wind turbines nor solar panels and has not been exposed to sound information about them. Rather than see their potential benefits, he was frightened by them. Renewable energy as a contribution to sustainable development at the local level needs the buy-in from residents such as Hendrik. He is unlikely to ever see the benefits of investment in renewable energy if he does not have at least some understanding of why it is being used.

Other residents were however more positive towards the introduction of renewable energy in De Aar. According to Luke, '*...kyk, daai panele, hulle is mooi, maar soos jy aankom in De Aar dan kan jy sien hoe mooi is hulle, hulle lyk soos water* // Look at those [solar] panels, they are beautiful, but as you arrive in De Aar you can see how beautiful they really are, they look like water' (interview, April 2018). Luke spoke of the panels glistening in the sun, reflecting the light as if they were a dam in the middle of the arid Karoo. He regarded the electricity the solar panels generated as a positive contribution even though he was not benefiting directly as he had no electricity connection. However, for Luke just seeing the large body of 'water' outside his town was something positive that the IPPs brought to De Aar.

## 6.5 Conclusion

Kareeville is a poor community that is heavily dependent on state grants and subsidised services for people considered indigent, including free basic electricity, to get by. Although households are not absolutely destitute, most are struggling to meet their needs as defined by them. While residents have access to a variety of electrical appliances, they cannot afford to run them consistently and have to make use of a variety of supplementary fuel types to meet their needs; some also resort to strategies that can be considered dangerous, unhealthy and illegal. This is consistent with what the literature on low-income households reviewed in Chapter Three has shown. A very small number of people (seven altogether) in the 50 households in the survey had found employment with the various IPPs during their construction phase but none of them were still employed by the IPPs

when my survey took place in 2017. Most residents knew very little if anything about the technology of renewable energy nor the impact of the IPPs in town.

The following chapter will unpack the energy usage and challenges of Kareeville residents in more depth, using the narrative account drawn from my follow-up interviews (in 2018) to show how household energy poverty plays out on a daily basis in individual households. These narrative accounts aid in the understanding that while households may have access to electricity as their primary resource for cooking, lightning and heating of water, its affordability is not a given and it is frequently insufficient to meet basic needs. Those responsible for managing household energy have to constantly strategise and adjust domestic arrangements around especially cooking and washing as household circumstances and needs change.

## Chapter Seven: Managing Household Energy in Kareeville

The following chapter provides insight into the energy usage and energy challenges in a selection of low-income households in Kareeville. It draws on my semi-structured interviews with seven Kareeville respondents from five of the fifteen households that I selected from my survey sample for follow-up interviews (as explained in Chapter Two), supplemented with data from the household survey and my remaining in-depth interviews. The discussion is organised around descriptive narrative accounts of energy use in these five households (my 'vignettes') in section 7.1, followed by a more thematic account in section 7.2 of five common strategies for managing scarce energy resources that emerged from my interviews: gathering firewood, borrowing to buy electricity, limiting food options, limiting use of electrical appliances and lastly, illegal connections and bribery. I conclude with a discussion of the gendered and generational tensions that can be seen at work within the household.

Table 7.1 (previously presented in Chapter Two as Table 2.1) provides a summary of my seven respondents and their households in terms of their household size, the number of social grants received, and household members employed, and children under the age of 18, as well as estimated household and per capita expenditure on electricity monthly. Table 7.2 summarises the information on the other 10 follow-up interviews for reference. The estimate of household expenditure on electricity that was reported in the interviews was checked against the survey data for that household. However, a caution is needed as to the reliability of the estimates of expenditure on electricity as my informants were not all equally confident about the amounts, and electricity purchases were often made on an ad hoc basis. For instance, Rebecca and Alexander could not provide me with a precise estimate for their average monthly electricity expenditure but described it as falling between R250 and R500 per month. As argued in Chapter Three, Section 3.3.2, expenditure on fuel types is in any case not an accurate measure of the extent of energy poverty, as it does not take into account going without electricity when money has run out, nor reflect the pressures being placed on people to acquire particular fuel types, including electricity.

For similar reasons household income and income per capita per month have also been excluded from Table 7.1 as my informants were often uncertain about the earnings of

household members who were working or had access to other sources of income, such as remittances from absent partners or illicit activities. Ten of my 17 respondents could provide me with rough estimates of their total household income per month (which ranged between R760 and R13 500) but monthly incomes were fluid, with work often part-time, informal, or seasonal. Respondents were more confident about the social state grants coming into their households and this information is reflected in Table 7.1 (the child support grant as CSG; the disability grant as DP and the older person grant as OPG. All of the households are dependent on social state grants to supplement their income, with the child support grant the most common grant received. In the case of Mia, state grants are the only source of income with which to meet basic household needs. What is evident is that all five are low-income households.

Table 7.1: 'Vignette' households: size, income, estimated monthly electricity expenditure

Respondent (pseudonyms)	Household size	Recipients of social grants	Nature of grants	Household members employed	Children (under 18)	Estimated spend on electricity purchase per month	Per capita expenditure on electricity per month
Lisa	15	7	6 CSG 1 OPG	1	12	R400	R27 per capita
Steven & Samantha	11	3	3 CGS	5	4	R150	R14 per capita
Emmie	9	4	4 CSG	4	4	R500	R50.5 per capita
Mia	7	3	2 CSG 1 OPG	None	4	R400	R57 per capita
Rebecca & Alexander	7	3	2 CSG 1 DP (Adult)	1	3	R250- R500	R36-R71 per capita

The five households are large to very large (above the average household size of 6.4 for Kareeville that was established through the survey). Four out of the five households receive Free Basic Electricity which supplements their electricity with 50kw/h month. The fifth household, that of Emmie, is a poor household but does not qualify to receive the FBE because the total income in her household falls above the threshold for indigent households in the Emthanjeni Municipality.<sup>54</sup> It must also be noted that the municipality calculates household income by including the social state grants received (Abraham,

<sup>54</sup> Total household income must be below R4750.

municipal official, interview, May 2020). All five of the households collect firewood as a supplementary source for cooking or heating water and make use of candles, paraffin, and gas from time to time as well.

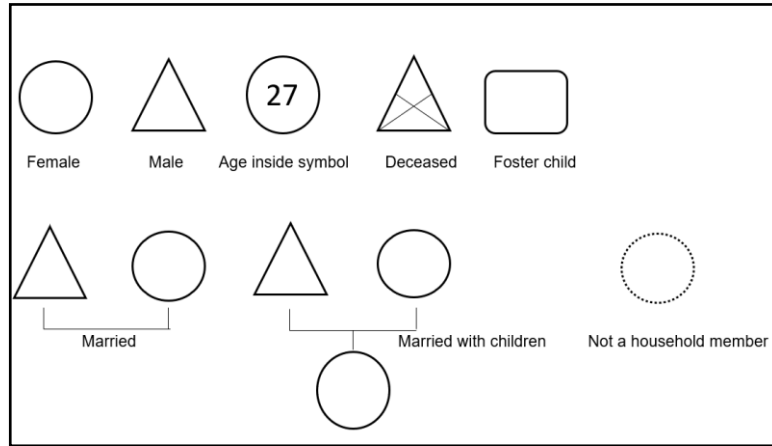
Table 7.2: Other informants for follow-up interviews

Pseudonym	Age	Gender	Household size	Employment status
Claudia	30	Female	5	Studying full time and not able to work
Janet	37	Female	6	Unemployed (searching for work)
Bernard	55	Male	12	General worker for the local municipality
Luke	48	Male	2	On a disability grant and cannot work
Olivia	60	Female	9	Pensioner
Cherise	42	Female	2	Stay-at-home mother
Marie	52	Female	7	On a disability grant and cannot work
Zoey	Mid 40s	Female	12	Unemployed (searching for work)
Hendrik	35	Male	4	Unemployed (searching for work)
James	77	Male	2	Pensioner

## 7.1 Energy challenges: Five household vignettes

To show the family relationships in each household ‘vignette’ that follows I have used a genogram, a graphic representation of the marital and filial relationships of household members, to depict household composition. The icons and lines used to represent men and women are shown in Figure 7.1. Males are indicated as triangles and females as circles with lines showing relationships of marriage and descent. The age of individual family members is included inside the icon where known.

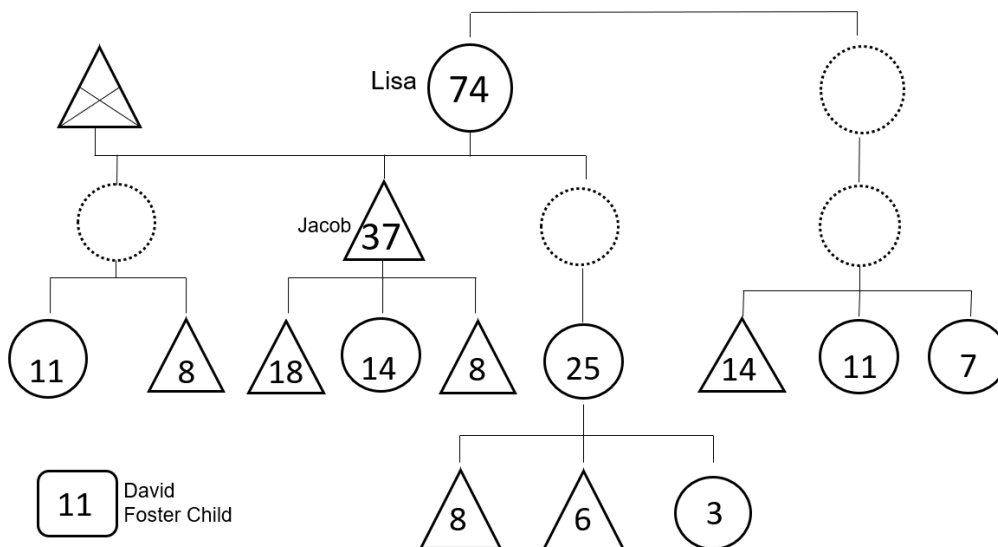
Figure 7.1: Genogram Legend



7.1.1 Lisa's household

At 74 years of age, Lisa was one of the oldest of my survey respondents. She is widowed and the head of a complex household of 15 people: her son, six grandchildren, three great-grandchildren, the three grandchildren of her sister (who stays in Kimberley), and a foster child whom she took in after finding him living on the street in De Aar. (See Figure 7.2 below.) Her two adult daughters are currently employed as live-in domestic workers on farms elsewhere in the municipality. Her household, while one of the largest in the survey, was not atypical in terms of its multi-generational nature and dependence on social grants.

Figure 7.2: Genogram of Lisa's household (2017)



The household lives in a two-bedroom RDP house with a kitchen, living room, and an outside bathroom with a flush toilet. Compared to the other houses on Lisa's Street, her house was well kept with a beautiful garden filled with greenery that did not fit with the harsh Karoo landscape surrounding it. Lisa told me that in the past she had worked on a farm near Philipstown but had moved to De Aar some 20 years previously to help her son who was working on a farm as a general worker. She decided to stay, initially to assist her son with his children as they were born, and then to take in more of her grandchildren and other children whose parents were working elsewhere and not able to look after them:

*Hierdie kinnertjies waarvan [die] ouers op plase werk, gasteplase en plaas werk, dis net hierdie kinders wat ek nou sit en oppas//* These little children whose parents work on the farms, guest farms and do farm work, it's only these children that I now take care of (interview, April 2018).

Lisa's household relies heavily on social state grants, as they had only one member of the household employed when I interviewed her in 2018 and they were spending approximately R400 on electricity which translates to R26.6 per capita, per month. According to Lisa, the parents of the children she is looking after are scattered. Some left to look for work in Cape Town and Johannesburg while others are in Kimberley. She also explained to me that at first, she had wanted to ensure that her son enrolled his children in school and thereafter took responsibility for all her grandchildren and great-grandchildren and even fostered a homeless boy, David, age 11 in 2018, as she believed she could provide a home for him. David is not officially fostered or adopted by Lisa. Lisa alluded to the fact that he was born 'on the streets'. It is possible that he does not have a South African identity document or birth certificate and therefore Lisa is not receiving a grant for fostering him. In addition, five of the children that are eligible for child support grants are not receiving them. When I asked Lisa about this, she simply shrugged and stated that she was not the parent.

Two of Lisa's grandchildren, aged seven and eight, and two of her great grandchildren, aged six and eight, are not enrolled in school. The other children under 18 all appeared to be going to school although several were old for their grades - for instance the 18-year-old was in grade 9 while David was in grade 1. Lisa herself cannot read or write.

Lisa's son, Jacob, is the only employed member of the household. He works for a farmer on a regular basis and earns a steady income. However, he has chosen not to disclose

the amount that he earns to Lisa, so she was uncertain how much of it he was contributing to household expenses. Rachel, her 25-year-old grandchild, was unemployed. I was told she has chosen not to look for work so she can help Lisa look after her own children and the other children. In 2018 the household was, therefore, dependent on six child support grants, one old age pension grant (Lisa's) and Jacob's income. The household was receiving more than R4 000 per month in state grants which was a major source of support for all 15 members. Absent parents did send remittances from time to time but details of this were not available.

Lisa plays a major role in managing the household budget and undertaking household responsibilities such as cooking, cleaning, and gathering wood. She relies heavily on electricity and electrical appliances, with firewood her main secondary source of energy. Like two-thirds of the households that I surveyed, her household receives free basic electricity from the municipality for which Lisa is thankful. She estimated that on average she was spending around R400 per month on electricity (in 2018). The actual amount differed each month, depending on the season. She bought small amounts of electricity on a need's basis and not as a lump sum, spending around R50 each time. She noted that they could not afford a heater, but, like many other Kareeville residents, her household was equipped with a refrigerator, an electric stove, one overhead lightbulb, and a television. Her son, Jacob, had a cell phone but the device cannot access the internet.

Lisa also handled the purchase of electricity for the household because she did not trust other family members with the responsibility:

*Ek koop die papiertjie. Ek sit [dit] daar waar ek weet waar, want die kinders se koppe is deurmekaar, hulle weet nie waar bêre ek, waar die krag is nie. // I buy the little paper [electricity voucher]. I put it away where I know it is because the children are confused, they do not know where I hide it, where the electricity is (Interview, April 2018).*

She complained that family members were careless with the electricity voucher because they were not the ones cooking food for the household. She described to me how furious she had been after her granddaughter (25-year-old Rachel) had recently lost a prepaid electricity voucher for R20's worth of electricity:

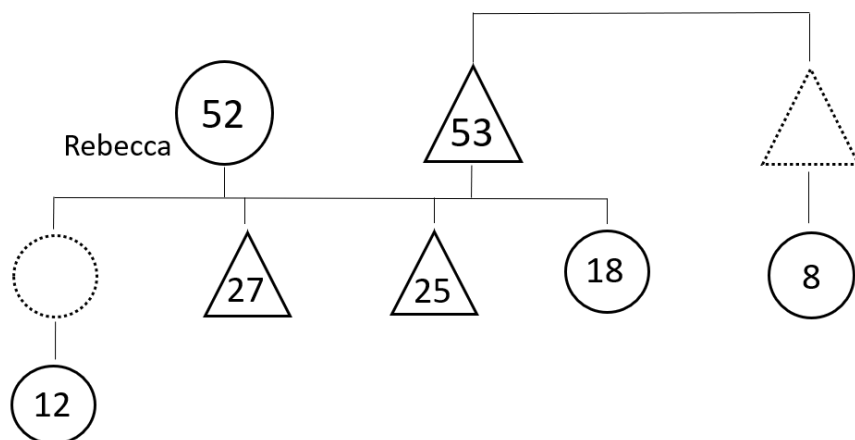


*Hulle het nou laas week, seker R20 se krag weggegooi...Ek sê, waar het julle dit gebêre! Nee hulle weet nie...Eendag toe kry die meitjie die krag, toe sê ek: sien jy hoe mal is jy! Ek gaan nie meer dat jy krag indruk nie...ek gaan nou dat die mannetjie ...onthou dis ons wat sonder krag sit! Partykeer sit ons sonder krag to die nag...as die krag so weg word is daar nie weer krag in die nag nie. Dan moet ons bietjie bitter sukkel..... en hulle kry brood //Just last week they threw away probably R20's worth of electricity ... I asked them, where did you put it! No, they do not know...Then when the little girl found the electricity [voucher], then I said: do you see how crazy you are! I am no longer going to let you punch in [the code for the] electricity... I am going to allow the guy [her son] to load the electricity onto the metre... Remember, that's [all of] us that sit without power! Sometimes we sit without electricity till the evening... when they throw the power [electricity voucher] away like that then there isn't power during the evenings. Then we struggle badly... and they get bread [for dinner] (Lisa, Interview, April 2018).*

#### 7.1.2 Rebecca and Alexander's household

Another household in Kareeville that is very cautious in its usage of electricity is that of Rebecca and her husband Alexander. Their household is shown in Figure 7.3. In addition to the two of them they live with their three children, their daughter's child, and the son of Alexander's brother. They were interviewed during the survey together as Rebecca insisted that Alexander could answer the questions about household income and renewable energy better than she could. In the follow-up interview, Rebecca was initially interviewed alone but she later invited Alexander later to join as she believed he could best assist me with my questions relating to household expenditure. Worth noting is that despite Rebecca's faith in him, Alexander knew less than his wife about the household's energy needs, fuel usage, or household expenditure. He was, however, vocal about the local municipality's failures regarding maintenance and as well as needs beyond electricity such as job creation and the provision of better recreational facilities.

Figure 7.3: Genogram of Rebecca and Alexander's household (2017)



Rebecca and Alexander both left school in grade 10 (standard 8). Their son, aged 27, had a matriculation certificate and was the most formally qualified person in the household. Their other two children left school in grade 8 and grade 9 respectively. Rebecca did not comment on their early departure from formal schooling. Their grandchild, aged 12, and nephew, aged 8, were enrolled in their respective age grades at school.

In 2018 Rebecca was the only household member who was employed, working as a domestic worker. Other than the income from this work her household is reliant on state grants for its income. The income from this is R2360 per month. Rebecca also reported receiving a disability grant which suggested that her work as a domestic worker was informal and perhaps not on a permanent basis. The household was thus in a similar situation to Lisa, having only one member of the household employed (in a low-wage position) and relying heavily on social state grants.

Rebecca described herself as solely responsible for the cooking in the household. According to her she tried to set aside between R250-R500 for electricity per month and the household also receives the Free Basic Electricity subsidy. She tried to cut electricity costs by not cooking every day; although she regarded the refrigerator as a major drain on electricity, she did not unplug it as Alexander had told her she is not allowed to do so. In 2018 the household relied on firewood to supplement their household energy needs, although Rebecca does not like to cook with or heat water on a fire. In the interview she reflected on how she had become used to the convenience and cleanliness of electricity: *'Dis te veel werk en swart hande, swart neus...ek sal nie kan terug gaan na dit toe nie'*// 'It's too much hard work, black hands, black nose...I cannot go back to it' (Interview, April

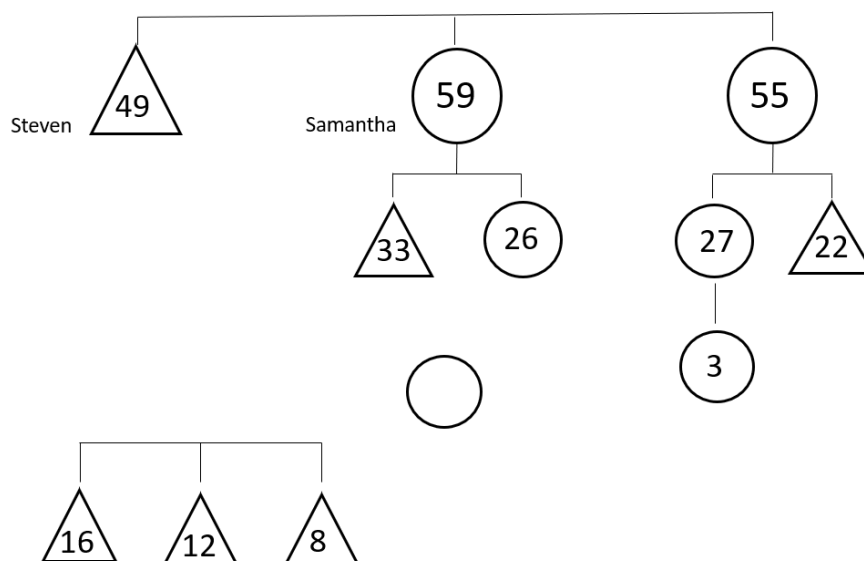
2018). Additionally, using a fire meant more work to wash the smell of smoke out of one's hair and clothes. However, circumstances often dictated that they had to use firewood.

Like Lisa, Rebecca spoke of the importance of not living isolated lives and having an attitude of give-and-take towards one's neighbours. She referred specifically to the need to borrow money to purchase electricity: '*Leen vir my R50...Laat ek kan krag koop... Ons moet onder mekaar, mens moet saam lewe!*' 'Lend me R50...so that I can buy power ...We must support each other; we have to live together' (interview, April 2018).

### 7.1.3 Steven and Samantha's household

Steven and Samantha are siblings who share their two-bedroom house (the living room has been converted into a bedroom) with another sister and five other household members spanning three generations. In addition, there house was shared with four children whose exact relationship to the rest of the household I was unable to establish. (See Figure 7.4.)

Figure 7.4: Genogram of Steven and Samantha's household (2017)



This large, complex household was not an isolated case nor was it an outlier. It differs from the previous two described in that five of the adults were working on a full-time basis and contributing to household income, although none of the jobs were high paying. Their occupations were as follows: domestic worker, assistant at a laundrette, fitter at a garage, classroom assistant, and assistant at a security company. In addition, in 2018 the household received three child support grants for the children aged 16, 12 and 8; they had

not yet applied for a child support grant for the youngest grandchild in the household, aged three. Samantha was not aware of what her son and her daughter were earning each month as they would not divulge this information. She was willing to share that she was earning R16 per hour as a domestic worker. While low, this was higher than the set minimum wage for domestic workers working in non-metropolitan areas, which in 2017 was set at R13.53.<sup>55</sup>

Her brother, Steven, was unemployed but had worked for the South African Police Service (SAPS) in Cape Town before being suspended. He did not go into the details but assured me, during the survey in 2017, that he was not guilty of the charges levelled against him and had submitted documents to the SAPS in Cape Town to prove his innocence. His wife and daughters were still staying in Cape Town (in Mitchells Plain) where Steven owned a house. He had moved back to De Aar temporarily in 2015 while waiting for the outcome of his case. In the course of the interview in April 2018 he said that he had won the court case against him and would be returning to Cape Town at the end of the month.

Despite being based in Cape Town and the youngest of the three siblings, Steven was seen by his family as the head of the household. Samantha regarded him as the owner of the house because he was a man, even though he had a house in Cape Town. According to Steven, the house in Kareeville was still registered in his father's name but it had been passed on from his parents to him. He spoke about bringing his wife and two daughters to De Aar, to stay with himself and his two sisters in their house. His family, however, was waiting for him to find employment and another house before they would join him in De Aar. He had a great dislike for Cape Town as he said it was a dangerous environment in which to raise children and he could not protect his daughters against the gangsters. He recognised that the Kareeville house was too small to accommodate his family as well and he therefore had to secure another place but was enjoying staying with his sisters in the meantime.

Steven said he remembered that in the early 1990s there had been 20 people in the house. I could not hide my shock -- 20 people in a two-bedroom house. Steven noticed my shocked expression and began to explain that it had been members of the extended family: aunts, uncles and cousins. He remembered it as a good time when the family was

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<sup>55</sup> This would be increased to R15 per hour in May 2018 (Republic of South Africa, 2017:9)

together and there were many hands to help not only financially, but also with child rearing and there was always somebody to talk to. Since then, most of his aunts and uncles have received RDP housing in different towns or had married and moved away.

Similarly, to Lisa's household, Samantha, the oldest sister, was solely responsible for cooking for the household. It was unclear to me if this was her choice. She spoke to me in detail about her cooking strategy: '*Jy kan nie kook by 3 [eenhede] nie...[ons] worry [dan] ook nie...dan eet jy brood...Ja, suiker water en brood*' // You cannot cook on three [units of electricity] ...[We] don't worry ...then one eats bread...Yes, sugar water and bread'. This was also something they had done as children: '*Ons het so groot geraak hier in die huis*' // We grew up like this, in this house' (interview, 18 April 2018). Towards the end of the month, she would have to go as far as unplugging the refrigerator as it simply 'eats the power // [*Hy eet die krag*]' (interview, April 2018). She was, however, less concerned about using the kettle and microwave which to her were more economical and would not be unplugged.

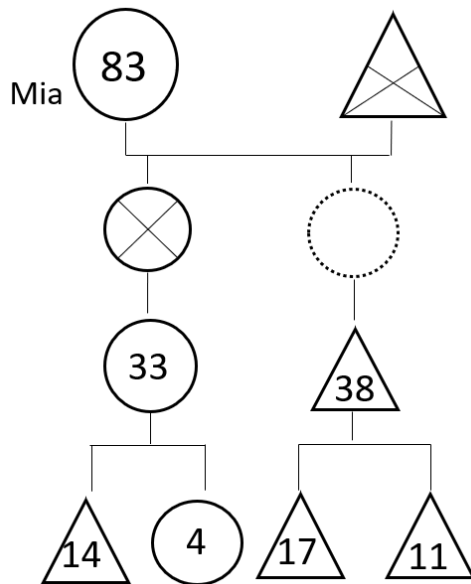
Samantha also spoke to me about her dislike of electric stoves with spiral plates: '[I] hate those spiral plates] ...solid plates provide you with more heat than those spiral plates'. This was a viewpoint of several women in Kareeville with whom I spoke. Samantha's issue with the spiral plates was not with how efficiently they heated the food but rather that they did not keep food warm for long. With seven adults and four children in the house it was not possible for everyone to be home when dinner was prepared and ready to be served and the solid-plate stoves kept food warm for longer even after they had been switched off. Samantha also noted that she would never waste electricity by reheating food. This was seen as a luxury and was not allowed in the household. If you were not at home around their agreed-upon dinner time; you will receive a cold meal.

#### 7.1.4 Mia's household

In 2018 Mia was 83 years old, the oldest of my respondents. I interviewed her twice, once when her household consisted of seven people - herself, her two grandchildren and four great grandchildren – and the second time when she lived alone. Having heard, during the survey, about her struggles with her grandchildren I questioned if they were happy with her previously mentioned cooking schedule. Mia would cook just one meal a day and bake a loaf of bread every other day. Mia smiled and told me she was living alone, happily, while her grandchildren and their children were visiting other family members. However,

they would be back in a few weeks and then her usual cooking regime would continue. Mia was quite happy living alone as her energy consumption was low which meant she could cook more and spend money on things that she usually could not afford. The usual composition of her household is shown in figure 7.5.

Figure 7.5: Genogram of Mia's household (2017)



When everyone is living together the household relies on the income from social state grants and one wage of R5 360 per month. Mia uses her old age pension to buy electricity, spending about R400 on electricity every month. Like Lisa, she buys R50 of electricity at a time which she sees as a responsible way to control the amount of electricity consumed as the other members of her household used electricity as they please, leaving the television on for hours, always playing the radio, and demanding that certain foods be cooked. She also spends R80 on gas for her one-plate gas burner, but 'that doesn't even last me for a month'.

When asked if R400 of electricity was enough, Mia replied that she had to use gas when cooking any meal with corn or beans (which her family preferred) as they take longer to cook; '*As ek mielies of boontjies kook, dalk afval koop...dan kan ek nie daai stoof aansit nie want hy vat n lang tyd om gaar te kook...[ek kook dan] op die gas potj'* // If I cook corn or beans, maybe buy offal... then I can't put that stove on because he takes a long time to cook. ... then I cook on the gas stove' (interview, April 2018). Mia has timed her cooking to perfection. She could tell me exactly which meal took the most amount of electricity,

which meal was the quickest to cook, and which ingredients took the longest to cook, Like Steven and Samantha, she complained that neither a spiral stove plate nor a four-plate stove met her household's energy needs efficiently. While the spiral stove is effective in heating food quickly, it does not keep food warm long enough so that all household members can get a hot meal when they come home.

For light Mia makes use of three paraffin lamps. According to Mia, she paid R14 for a 500ml bottle of paraffin which she rationed amongst the three lamps. While Mia used these lamps, she regarded them as old fashioned, inefficient, and inferior to electric lights:

*Nee, ek sal nie regkom met die lampe nie, want regtig, die krag is nou so, hy is nou baie belangrik vir ons ..By die lampe kan ek nie mooi sien nie, ek is reeds blind. Vir my is krag nogal baie belangrik. Ons is mos nou in daai tyd wat ons krag gebruik, en nou is dit vir ons maklik en gou. Daai tyd toe ons die kerse en daai goete gebruik het, daai is nou verby. // No, I won't manage with the lamps, because really, the electricity is now like this, it is now very important to us...With the lamps I can't see well, I am already blind.<sup>56</sup> For me, electricity is quite important. We are now in that time when we use electricity, and now it is easy and quick for us. That time when we used candles and those things, that time is now over] (interview, April 2018).*

However, because Mia could not always afford the electricity her household needed, she was still having to use of source of energy from the old days.

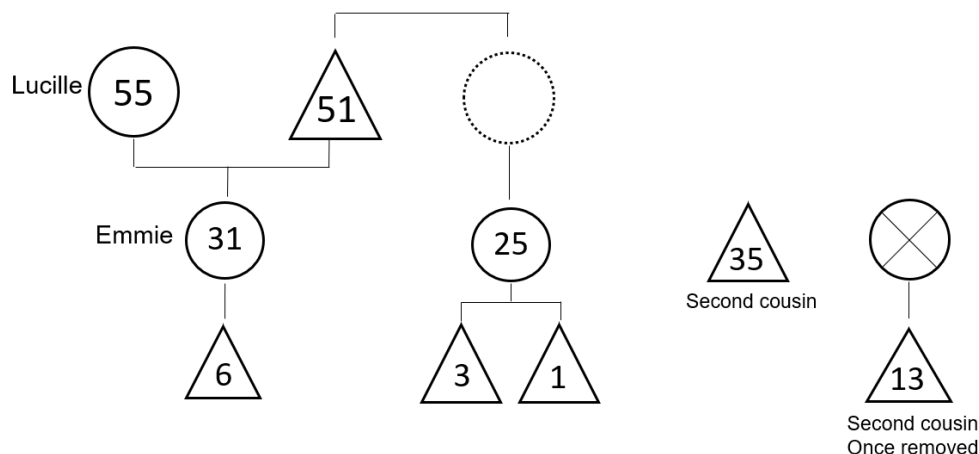
#### 7.1.5 Emmie's household

In 2018 Emmie was a 31-year-old unemployed woman who lived with her child, her mother (55 years old) and father (51 years old) and five other household members; her cousin and her two children and two other relatives whom Emmie could not place in the family tree. The composition of her household is shown in the genogram in Figure 7.6.

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<sup>5656</sup> Later in the interview Mia told me she had been told at the clinic that she has cataracts in both eyes. Mia cannot afford the surcharge that she would have to pay for the procedure so had no interest in having them removed. In 2016 the surcharge at a Western Cape government hospital was R1800 (Western Cape Government, 2016).

Figure 7.6: Genogram of Emmie's household (2017)



Her mother, Lucille, had no formal education and could not read or write. She was working as a baker while her father, who had only attended school up to grade eight was employed by the South African National Defence Force at the ammunition depot in De Aar. Emmie did not know what her father's job entailed and was unsure of his position in the army. Both of her cousins (25) and (35) had completed their schooling and were working at the De Aar abattoir while Emmie was taking care of her cousin's 3-year-old son and 5-month-old baby during the day. Her son (6) and her 13-year second cousin were attending school in De Aar. Emmie herself left school after having completed grade nine. She would like to find work and had sent her CV to various companies but had yet to receive a reply. She attributed her struggle to find employment to the fact that she had not completed school. She also questioned who would look after the small children if she were also to find employment. However, she was upset that she was still living with her parents: '*Dis moeilik om [werk] te kry... jy moet by jou ouers bly en jy raak groot, jy kry kinders. Hier bly ons opgepak in kleinhuistes*' // It's difficult to get work... You have to stay with your parents, and you grow up, you have children. Here, we live on top of each other in tiny houses' (interview, April 2018).

Emmie could not provide me with her niece and nephew's income per month as she said they kept it a secret from the family. She told me her father was earning more than R8 000 per month and her mother was earning approximately R200 from selling her baking goods. Her son and the other three children in the household all received the child support grant. The household tried to spend no more than R500 per month on electricity. The family owns an electrical heater, but Emmie just shook her head when I asked her how they cope in the cold winters in De Aar as the heater is too expensive to run:



*Dit raak verskiklik koud...koue winde [maar] jy kan nie 'n heater in De Aar in die winter aansit nie, die eenhede loop af, dit gaan vining af. 'n R100 se krag sal twee dae hou as jy 'n heater aansit. // It gets terribly cold ... cold winds [but] you can't put a heater on in De Aar in the winter; the units [kilowatt units] run down; they go down fast. A R100's worth of power will last two days if you switch on a heater] (interview, April 2018).*

Emmie's household uses both electricity and gas for cooking as a way of saving on electricity. Her father allocates R300 per month to fill their gas bottles which are not just for emergencies but function as a primary energy source for cooking:

*Ons gebruik 50% krag en 50% gas vir kook en ons doen dit reeds om eletrisiteit te bespaar. Ander mense sal vuur maak of parrafiën gebruik. Ons maak net vuur as omstandighede ons forseer // We use 50% electricity and 50% gas for cooking, and we do this to save on electricity. Other people make a fire or use paraffin. We make a fire only if circumstances force us (interview, April 2018).*

Emmie worries when the units on the electricity metre run low. She regards their refrigerator and deep freeze as the appliances that are the heaviest users of electricity. Her mother, Lucille, refuses to unplug these appliances but allows the radio and television to be unplugged, and has set up a schedule for when the television may be used:

*Die tv mag aan as die kinders uit die skool kom 12:00, tot vanaand 21:00, [maar] dan moet hy af. As sy dit aan sien, dis 'n geskellery...Sy sê ons moet lees...Sy gaan aan, sy sal so aangaan, jy moet maar skelmpies wag tot sy slaap... dan kyk jy jou shows...Sy verstaan ook nie wat mens vir haar sê nie. Ek sê vir haar die TV vat nie eens krag nie, sy voel krag is krag, dis duur! // The television may be switched on if the children come home from school at 12:00, until 21:00, after that, it must be off. If she sees it on, it becomes a fight ... She says we must read... She goes on, she'll go on [yelling and fighting]; you just have to secretly wait until she sleeps and then you can watch your shows ... She doesn't understand what you tell her. I tell her the TV hardly uses power; she feels electricity is electricity, it's expensive! (interview, April 2018).*

The generational tensions between Emmie and her mother play out in other households as well as is discussed in section 7.3 below. In the next section I unpack five recurring strategies for coping with energy poverty.

## **7.2 Strategies for coping with energy poverty**

### **7.2.1 Relying on firewood**

As already described in Chapter Six, firewood was collected as a fuel source by 30 of the 50 households in my Kareeville survey. It was the most common secondary resource for cooking and the heating of water. However, there are very few trees in this part of De Aar, apart from a row of Eucalyptus trees along Willow Street on the eastern edge of the neighbourhood; there are also no woodlots for people to turn to. Given both the absence of trees in this Karoo neighbourhood and the dependence of its residents on firewood as a supplementary source of fuel, it is painfully ironic that, as seen in figure 7.7, the streets in Kareeville extension 10 have been named after exotic trees (translated into English: Cypress, Pine, Cedar, Willow, Eucalyptus, Syringa, Elm and Poplar).

Figure 7.7: Satellite image of survey site, showing street names



Source: Google Maps 2022

While some households purchase firewood, others avoid this if they can. Lisa does not usually purchase wood at the small shops in the neighbourhood but prefers to gather it for free herself. Occasionally she purchases branches from municipal workers when they trim trees in the area and bargains with them for a price she can afford. According to Lisa,

*ons maar loop soek [vir hout], hier by die plekke rond...dan sny hulle doer in die dorp waar dit baie ver is... maar die ander vrouens maak skoon daar met die houtjies. As hulle bome saag, dan moet jy maar eerder gou...hout gaan haal // We have to look [for wood], here around the area... then they [the municipality] cut [trees] there far away in town... but the other women are quick to clean up the wood there. If they are trimming trees, then you should rather go quickly and fetch wood for yourself (interview, April 2018).*

Buying wood from the municipal workers is more convenient if one can afford it, as it is less time-consuming than searching for *houtjies* [small pieces of wood] oneself:

*Dié mense [munisipaliteit] wat so die houtjies loop saag en dan dra hulle die houtjies, ruil dit uit. Dan koop ons as ons 'n geldjie het, maar as ons nie het nie loop kry ons maar self // These people [municipal workers] walk around cutting the pieces of wood and then they carry the pieces of wood around and exchange them [for money]. We buy it if we have a bit of money, but if we do not have [money]...we get it [firewood] ourselves (interview, April 2018).*

At the age of 74 at the time of my interview, Lisa was still regularly gathering firewood for cooking, heating of space and also for heating water for washing the dishes. She found it quite an arduous process but continued to look for firewood as fire is a good source of heat for her large household. She told me she often collected the wood by herself as her grandchildren did not want to be seen with her scavenging for firewood: *'Die kinders, hulle is skaam // The children, they are ashamed.'* When her grandchildren and her sisters' grandchildren were younger; they regarded picking up wood with their grandmother as a fun excursion but now that they were older, they did not want to be seen doing this by their peers. This made the search for firewood during the summer a particular struggle as carrying the wood home alone in the hot weather was too much of a burden for her. In the winter, collecting firewood alone was not much easier. Lisa complained that other residents in Kareeville were quick to grab the pieces of wood nearest to where she lived. Then she had to force other household members to help her find firewood, which they were reluctant to do and caused some infighting.

Several respondents who said they could not afford to buy firewood would collect branches or stumps at the town's landfill site approximately some seven to nine kilometres away depending on which road they took. The shortest route would follow the R48 and then cut across De Aar East, the more affluent area of town. The longer route cuts across De Aar West and follows the R388 past the new hospital and turns left into Leo Crescent. According to Hendrik, another of my respondents who lives in the street next to Lisa's, in the past the local municipality had designated a special area where people could get wood, but this was no longer allowed:

*Die raad laat ons nie eens meer toe om hout te maak nie. Daar was 'n plek waar ons hout maak, ons mag nie eens meer hout maak nie....doerie jare het die bome daar gestaan, dit was 'n riool. So, die bome wat daar gegroei het was baie groot, daai jare het hulle nog dat die mense dit gaan saag. Nou het hulle dit gestop. Jy*

*moet winkel toe [as jy wil hout kr]]. R25,00 {vir n sak}. Dis twee, drie, vier stompetjies. Dis baie min. Dis nie eens mooi hout nie. Dit brand nie eens nie. //*  
 The council no longer even allows us to fetch wood. There was a place where we could get wood, we are not even allowed to go there anymore... for years the trees stood there, it was a dump. So, the trees that grew there were very big, in those years they still allowed people to cut those trees. Now they have stopped it. You have to go to the shop [if you want to get wood]. R25,00 [for a bag]. It's two, three, four stumps. It's very little. It's not even decent wood. It does not even burn [for long] (interview, April 2019).

In 2018, Hendrik was a 36-year-old father of twin daughters. He and his wife were unemployed. He reiterated Lisa's sentiments about the scramble for wood: 'It's every man for himself. As already described in Chapter Six, in the winter months Hendrik made a fire inside his house (Interview, April 2018). However, this has negative health implications.

### 7.2.2 Borrowing money

Residents also turned to loan sharks or borrowed money from neighbours to buy electricity and meet household needs. Marie, an unemployed 52-year-old woman who was the recipient of a disability grant and living in a household of seven, described borrowing money to buy electricity as 'broodnodig', literally bread-necessary, i.e., essential:

*Ja baie kere leen ek geld om elektrisiteit te koop. Dis broodnodig. As ons nie krag geld het niem, dan gaan ons die kinders bel en sê, Jong, stuur vir ons geld vir krag koop. Nou moet hy maar net vir my geld stuur. Ons moet maar net n plan maak om weer te koop. Hy is die baas, hy moet net n plan maak. Maak nie saak waar ons die geld kry nie. Ek sal liewers geld leen as n vuur moet loop soek en maak. //*  
 Yes, many times I borrow money to buy electricity. It's essential. If we do not have electricity money, then we are going to call the children and say, hey, send us money to buy electricity. He [her son] just has to send me money. We just have to make a plan to buy again. He is the boss [her husband]; he must make a plan. It doesn't matter where we get the money from. I'd rather borrow money than search for firewood (interview, April 2019).

Marie was responsible for collecting firewood in their household but considered it her husband's duty to secure electricity as he was the head of the household.

Lisa was one of many respondents who admitted to borrowing money specifically to buy electricity. She presented it as a matter of convenience because it meant one could cook food significantly faster than if one was using fire and one was also not spending time collecting firewood. She borrowed money from her neighbours even though they were *'rof en te kwaai'* [rough and too mean] and she felt they were taking advantage of her by adding an exorbitant interest rate to the loan: *'Hulle vra n klomp geld op 'n R100. R100 vra, dan moet jy R150 teruggee... Dis duur // They ask for a lot of money for a R100. Ask for R100, then you will have to pay back R150 ...It's expensive'* (interview, April 2018).

Similarly, Luke, who had no electricity connections relied on loan sharks to buy paraffin, *'Ek [moet] nou gaan skuld maak om parafien te koop, ek [moet] dit maar nou net doen. Want hoe gaan ek eet? // I [must] now go into debt to buy paraffin, I [must] just do it now. Because how am I going to eat?'* (interview, April 2018).

### 7.2.3 Limiting food options

As already noted, the type of fuel available influences the choice of food for cooking, a theme I was not expecting. For instance, when the units on her electricity metre were running low, Samantha would prepare meals that she considers 'light', such as boiled eggs or two-minute noodles, possibly with a cup of tea for herself, as her little treat. Marie was very mindful of how much electricity was needed to cook particular dishes:

*Al koop ek R20 se krag, ek weet presies hoe om te kook nou. Hy gaan baie vat as ek vleis kook. Ek weet vooraf wat ons gaan eet, want die hoender gaan mos gou gaar kook. As ek skaap moet kook, dan moet jy maar die ding uitwerk. Hoe gaan jy hom kook en wat jy gaan doen, maar tog, jy moet lewe. // Even if I buy R20 worth of power. I know exactly how to cook. It's going to use a lot [of electricity] if I cook meat. I know in advance what we are going to eat because the chicken will be cooked quickly. If I must cook sheep, then you just have to work the thing [your available electricity units] out. How are you going to cook it and what are you going to do, but still, you have to live* (interview, April 2019).

Lisa complained that her older grandchildren always wanted to eat meat, but this was a problem as it was the most expensive ingredient not only in terms of its price but also in terms of electricity usage. According to her she would struggle to stay within her budget if

she had to cook a meal with meat in it twice a week. She would prefer to cook smaller pieces of meat and also referred to chicken as being quicker to cook but often felt pressurised by her family to cook red meat.

#### 7.2.4 Limiting the use of appliances

As already noted, refrigerators were seen by many of my informants as major drains on household's electricity supply, even though they were also very useful for keeping food fresh, especially during De Aar's hot summers. Bernard, a 55-year-old general worker in the municipality living in a household of 12, also complained about his refrigerator's power consumption; when his household was running low on electricity, they had to juggle appliances:

*Die tv vat nie eintlik krag nie, dis die yskas. Ek sal partykeer die deep freeze uitplug. Die deep freeze is mos die vleis en so...maar die maand, verlede week, toe moes ons die yskas uitplug totdat ek weer krag kan koop. Die rede hoekom ek dit doen is sodat die kinders more moet ketel water maak. // The TV does not really use that much power, it's the fridge. Sometimes I will unplug the deep freeze. The deep freeze is for meat and so... but this month, last week, we had to unplug the fridge until I could buy electricity again. The reason I do this is so that the children have hot water from the kettle the next day [to bath in] (interview, 18 April 2019).*

Hendrik also complained about his refrigerator's energy usage. He felt that the six units per day that his fridge used were too much and therefore unplugged his refrigerator once or even twice a week. He told me he would like to convert to gas for cooking as his neighbours had told him it is less expensive, but this would mean saving up to buy the necessary cooker as well as a gas heater which he would like.

#### 7.2.5 Illegal connections and bribery

Illegal connections, while not observed directly during my fieldwork, are a reality in the town as the discussion in Chapter Five makes clear. As already discussed in Chapter Six, one of the households that I surveyed had been disconnected from the grid by the municipality because its electricity metre had been bypassed illegally. I was able to do a follow-up interview with Luke from this household, a 48-year-old man who was

unemployed but receiving a disability grant. During the survey in 2017 he was living with just his wife in a two-person household but when I interviewed him in 2018 there were two children under ten in his house. (His strategy for making a fire-drum to heat his house has already been described in Chapter Six, as well as his enjoyment of the solar farms because from a distance they look like an expanse of water). He told me that to get his electricity metre reconnected to the grid he would have to pay a fine of R1 000 to a municipal official. However, when I questioned this amount with him, he acknowledged that it was a bribe, but he was considering it because it was just a fifth of the official amount he would have to pay to the municipality.

Bribery was also mentioned by Bernard:

*Nee, kyk hulle weet mos as hulle jou krag afsit dan moet jy net planne maak. Al moet jy nou weer vir jou in die skuld gaan druk, jy moet maar net 'n plan maak. Jy gaan dit doen, dan kom sit hulle jou krag eers weer aan. Dit gebeur baie, hier is baie. Ek het vir die munisipaliteit gewerk, ek is nou af, ek het vir hulle gewerk, dit het met my ook gebeur en ek het dit toe nou oorgesien. My vrou wou opgestaan het, maar toe keer ek want die ding is ons het nie elke dag geld om mense om te koop nie, verstaan jy? // No, look they [the municipality] know if they cut your electricity connection then you just have to make plans. Even if you must now go into debt again, you just have to make a plan. You are going to do it [pay the fee], then they [the municipality] come and put your power back on again. It happens a lot, here are many such cases. I worked for the municipality, I'm off now, I worked for them, it happened to me as well and then I overlooked it. My wife wanted to protest and say something, but then I stopped [her] because the thing is we do not have money every day to bribe people, do you understand? (interview, April 2018).*

Bernard later told me that he owed the municipality R36 000 on his house due to missed payments. He blamed the previous owner of the house, a distant family relative. After the relative had died the house came to Bernard but he was not aware that there were payments owing on it. Now he cannot put the house in his name as he cannot afford to settle the debt owed to the municipality. When Bernard approached the municipality to settle the debt, he was told to pay a R1 500 penalty fee to reconnect his electricity connection. He was able to pay R500 which he borrowed from a family friend. He has not heard from the municipality regarding his electricity debt since then and his connection



was subsequently restored. He has also not received a receipt for the R500 payment which he believes the official he dealt with had pocketed.

### **7.3 Gender and generational tensions**

Threaded through the narrative accounts and discussion of strategies for managing energy poverty is evidence of a clear gendered division of labour around domestic responsibilities and hence the management of household energy, along with generational tensions around energy usage. Lisa's household is a good example of both. She is an elderly woman who, when I interviewed her in 2018, was solely responsible for cooking for a household of fifteen in which the majority of members were below 18 years of age. She was also responsible for much of the childcare, although aided by her granddaughter. She managed decisions around when to purchase electricity and also took on the responsibility for collecting firewood in order to heat water and cook food for her household.

The person responsible for cooking dictates not only what food is prepared but how it is prepared and which fuel source to use in preparing it, but this can set up difficult household dynamics as the energy manager becomes the antagonist within the household. Lisa felt responsible to put food on the table for her household and therefore took responsibility for managing the electricity as well. She explained that she had fought a lot with her granddaughter about electricity usage and wished her granddaughter would take more responsibility in the household by cooking and collecting firewood. While this points to generational tensions within the household there is also a gendered dimension. The only employed household member, her son Jacob, does not buy electricity yet expects to have cooked plate of food ready for him when he comes home and access to the television before other members of the household. He is also secretive about his earnings, with Lisa not sure about how much he earns and how much of that he contributes to the running costs of the household.

As a widow and the matriarch of the family Lisa had some authority in the household. In Marie's household a more conventionally patriarchal narrative was present. According to Marie, her husband was 'the boss' and therefore he was solely responsible for providing energy to the household. Marie told me that she expected her husband to secure electricity through any means necessary. The collection of firewood by gender varied amongst

households. Where a man was employed full time in a household, women were more likely to collect firewood as it was assumed they had more time to do so, even if they had additional household responsibilities such as cooking, cleaning and child rearing.

In Emmie's household generational tensions presented themselves in relation to the use of electricity for recreational purposes. In her household, her mother would restrict access to the television usage as a means to save electricity, driving Emmie and other household members to watch television behind her back, after she had gone to sleep. Generational differences around the use of appliances were picked up in my household survey, with older women who were responsible for cooking and childcare wanting to prioritise electricity for the refrigerator and stove and younger household members highlighting their need for entertainment which they satisfied through the television and radio.

Mia's household provides another example of generational tension with Mia responsible for cooking and managing electricity supply while the rest of her household are careless about leaving appliances on and how they use electricity. Mia was explicit about her struggles with her grandchildren although she was also grateful to them for having moved the toilet to the inside of the house and relayed water from the outside tap to the kitchen. She attributed her struggle with her grandchildren to the fact that she grew up in a different era, without electricity.

## **7.4 Conclusion**

As highlighted throughout this chapter, managing household energy access and consumption in poor households is a constant source of stress for those responsible for it, one which adds to the other stresses of living in a neglected and marginalised neighbourhood in a town that has been described as 'economically stagnant'. The 50kWh provided by the FBE is not enough to satisfy the basic electricity needs of these large, poor households and thereby contribute to improving their standard of living and helping them take steps towards 'the life they value' as per the model for sustainable development laid out in my conceptual framework in Chapter Three.

Households apply a range of strategies to meet their energy needs and reduce electricity consumption. From my interviews the following five strategies have emerged as most common: the collection of firewood, borrowing, limiting food options, limiting the use of appliances, and reverting to illegal activity such as bribery and electricity metre tampering. This translates into avoiding cooking foods that take longer to be cooked, cooking single-pot meals, and reducing the consumption of hot, cooked meals. Similar strategies have been reported in other studies of household energy poverty. (See for instance Cowan & Mohlakoana 2004.) Washing dishes and clothing is limited, as is lighting for evening activities, including homework for schoolchildren and recreational activities such as watching television. Deciding which activity takes priority can trigger conflict which often takes on gendered and generational dimensions. Younger members of the household are likely to be more interested in the recreational use of electricity (for cell phones and televisions) while older women are most likely to take on the responsibility for cooking, cleaning, and childcare.

This raises important questions about the neglect of local household electricity needs in the REIPPP programme as currently conceived. Against this background the next chapter reviews the socio-economic development and enterprise development initiatives of the REIPPPP in De Aar, to consider the extent to which they are making a significant contribution to 'social upliftment' for households such as the ones described in this chapter.

## **Chapter Eight: Socio-economic Development & Enterprise Development projects in De Aar**

In this chapter, I step back from my primary focus on household energy poverty in De Aar to discuss the scope and effectiveness of the ED and SED commitments of the six renewable energy projects in the vicinity of De Aar; as part of my enquiry into the contribution of these commitments to meaningful sustainable development. I draw in particular on my interviews with key informants from the Emthanjeni municipality, two local NGOs and a local economic development officer at a renewable energy company, as well as the small number of informants in Kareeville who were aware of these commitments.

As previously indicated, initial expectations of the IPPs in the Emthanjeni municipality were very positive. However, over time these high expectations were dampened. The local municipality felt side-lined, local residents felt disregarded, and some NGO staff came to feel that they were in competition with other NGOs in trying to gain and retain support for their activities from the IPPs. On the side of the IPPs there were issues of mistrust in relation to both the local municipality and among themselves, with companies electing to manage their commitments separately, account to the IPP office as required and not try to coordinate their community development activities among themselves.

My difficulties in setting up interviews with the IPPs have already been highlighted in Chapter Two. I was, however, fortunate to be able to interview two IPP employees, one of whom (pseudonym Patrick) was particularly open to reflecting on the challenges and limitations of their SED and ED activities. He was also sympathetic about the difficulties I experienced in trying to establish contact with IPP managers, explaining that he himself found it challenging to meet with the other renewable energy programme managers who did not want to discuss possibilities for joint programming with him. His words struck a chord with me. While project information should be in the quarterly reports that companies are required to send to the IPP office, as already noted this Office regards these documents as not for public consumption and refused to provide me with the information I requested on SED and ED programmes in De Aar. The problems around access to information which I encountered during my fieldwork mean that the perspectives of senior managers in the IPPs are regrettably not reflected in what follows.

The discussion is structured as follows. In the next section I discuss the local employment opportunities generated by the investment in renewable energy around De Aar, followed by the IPPs enterprise development commitments in section 8.2, socio-economic development projects in 8.3 and the community trusts in section 8.4. In section 8.5 I briefly review key themes emerging from this review.

## 8.1 Local employment opportunities

### 8.1.1 Misplaced expectations

Although the IPPs are primarily focused on generating renewable energy, the much-anticipated spin-off of jobs was what local residents, and the local municipality were looking forward to the most. This expectation is not surprising given the local framing of the IPP projects as job creation opportunities from the start. However, similar to what has occurred in other renewable energy sites, these expectations were largely disappointed. As noted in Chapter Seven, the residents of Kareeville acknowledged that the renewable energy projects had created some local employment opportunities but most of the respondents in my survey, 34 out of 50, reported that their households had not benefitted from these opportunities. The jobs that were created locally were also short-term contracts during the construction phase.

A staff member at the Ethembeni Trauma Centre in De Aar described the initial excitement and subsequent disappointment as follows:

*Die mense was baie excited want dis werk vir hulle, dis die mense se lewenstandaard wat hoog word. Jy kan maar se 10% van die mense het regtig gebenefit uit die solar capital uit ... Ons het gedink De Aar sal nou bietjie op n ander vlak wees na die sonpaneelmense [maar] dit was net n tydjie en toe is dit weer weg. Dit was net n wow-moment, en toe die plante mos nou klaar is toe is alles weer weg, maar wat sleg is, is dat die kontrakteurs bring mense van buite ... dit help nie veel vir De Aar nie, want die geld gaan nogsteeds uit die dorp. // The people were very excited because it works for them, it's the people's standard of living that gets high[er with employment]. You can only say that 10% of people really*

benefitted from one of the renewable energy companies in De Aar ...We thought De Aar would be a bit different [with regards to employment opportunities and capital investment]... it was just a while, and then it was gone. It was just a wow-moment, and when the plants were finished [construction had ended], everything was gone again, but what is worse is that the contractors brought people from outside [to be employed during the construction phase of the solar and wind farms] it doesn't help much for De Aar, because the money still leaves the town (Mary, interview, April 2018).

Patrick, the economic development manager at one of the solar farms, stated that when they began working in De Aar they felt like pioneers, having not only to adapt to their new environment but also navigate the expectations from both the local municipality and community. According to him, his first challenge was defining his portfolio:

*Ek het nie 'n clue gehad waarom die werk gaan nie, en toe ek die job eventually kry ook na die interviews en goed het ek nog steeds nie geweet waarom die job gaan nie. So, ek het maar gewerk soos ek aangegaan het. Ek het altyd geweet dat die company is veronderstel om terug te ploeg in die gemeenskap in, so ek was een van daai mense wat gefrustreerd ook gewees het oor die feit dat ek nie gesien het iets gebeur in die dorp nie. // I did not have a clue what the job was about, and when I eventually got the job after the interviews and well, I still did not know what the job was about it. So, I just worked as I went along. I always knew the company was supposed to plough back into the community, so I was one of those people who was also frustrated at the fact that I did not see anything happen in town (interview, April 2018).*

Particularly difficult to manage were the expectations of local contractors who did not have the necessary equipment or expertise to be sub-contracted during the construction phase of the solar farms:

*Daar was groot verwagtinge in die gemeenskap gewees, natuurlik die meeste in terme van werkseleenthede. Ons is mos veronderstel om plaaslike mense, even contractors, maar ons het, ons kon nie kry nie omdat dit moeilik is, en dit was een van die groot ontevredenhede ook gewees want die contractors voel [hartseer]...maar hulle het glad nie ge-qualify in terme van die project nie, hulle was baie streng gewees. Van hulle het actually along the way uitgeval want hulle...*

*dit ons mos maar soos dit is met al onse kliënte wat ons mee, veral in entrepreneurship [werk]. Die ouens het maar hulle eie agendas, jy weet? Baie is oor die feit dat hulle desperaat is en hulle wil maar net werk het. // There were huge expectations from the community, the most in terms of job creation. We were supposed to [use] local people, even contractors but we could not find any because it is difficult and that was one of the big let-downs because the contractors felt [emotional]. But they did not qualify in terms of the project. They [the renewable energy company] were very strict [in terms of what skills were required to assist in setting up the solar farm]. Some of them actually dropped out along the way because they... it's just like it is with all our clients that we work with, especially in entrepreneurship. The guys have their own agendas, you know? Many are about the fact that they are desperate, and they just want a job (interview, April 2019).*

These differences led to protests in 2013 and 2014 which temporarily halted construction at one the solar plants. According to Patrick, the protests were initiated by local contractors who had failed to get contracts with the IPP during the construction phase. The protests took place in De Aar and outside the gates of the solar farm. A municipal official described them as follows:

Moncada [the contractor assigned to construct the solar farm] was a serious problem, it was a mess of their administration. These people were not paying the subcontractors and then fighting in and out. As a result, the main boss of the company was so frustrated as they were so behind with payments...they have these Toyotas for transporting their workers. People were burning tyres on the main road, toyi-toyiing [protesting] on the Friday. This guy [the manager] decided that he was so frustrated that he took a bat and hit all the windows of the Toyota quantum taxis. Smashed them all. Police and security kept the community outside the gate. This contractor, therefore, failed [the solar company] (Daniel, interview, October 2017).

While I did not witness any protest action during my fieldwork, another researcher who was conducting research in De Aar did observe protests in 2020 (Nzo, 2021). According to Nzo (2021:59), these protests were related to the community's frustration towards the IPP's community trust as they could not see the benefits from the IPP's investment.

For Patrick, an employee of the IPP, the lack of transparency on the part of the IPPs was an issue:

*Een ding wat [ons] nie baie vinnig geleer het nie is transparency. Dit het maar woes gegaan met al die solar companies het dit 'n bietjie rof gegaan in die dorp in. [Ons is] mos 'n developer...[daarom] moes ons aanspreeklik gehou gewees het. So, dit was een van onse eerste real imprints wat ons gemaak het met die vertroue wat ons gehad het, en die mense was baie onsteld gewees. Hulle was verantwoordelik vir optogte. // The one thing we did not learn quickly enough was transparency. It was wild with all the solar companies in town, it got a bit rough in the town. [We] are the developer [of the plant]...[and therefore] we had to be held accountable. So, that was one of the first real imprints we made [on the people] with their trust and the people were very upset. They [De Aar residents] were responsible for protests (interview, April 2018).*

Trust or its absence was a recurring theme over the course of my fieldwork. Nzo (2021:60) has also argued that the secrecy and inaccessibility of the IPP's facilitates the spreading of 'rumours' and opens the IPP industry up to hearsay accusations among not only community members and local politicians but also researchers.

### 8.1.2 Job numbers

The IPP office (IPPO, 2021a; 2021b) heralds its national job creation statistics and the importance of REIPPP projects as boosts to the local economy. The exact number of local work opportunities created in the rollout of the REIPPPP is difficult to calculate as independent construction companies employ their own personnel and only use local workers for unskilled or semi-skilled work that is generally short-term. (See Malope 2022; Nzo, 2021; Khan, 2021; McDaid, 2016; Stands, 2015) As noted by Malope (2022), the measurement of job creation in terms of job-years is also misleading. There is a need for standardised reporting and transparency around the actual figures for actual jobs in order to analyse the employment opportunities created and address the just transition to renewable energy.

As noted in Chapter Six, my survey found only seven residents in my sample of 50 households who had been employed by a renewable energy company during its



construction phase. Two were employed for six months as unskilled and semi-skilled workers, one of them for a month. His sister described his experience as follows:

*Hy het dit omtrent geniet veral omdat die geld hom so gehelp het, maar toe is dit ook net vir daai maand en toe moes hulle weer terugkom en hulle het genoeg geld verdien daar. Hulle het nie verwag dit gaan net 'n maand wees nie, hulle is nou belowe dat as hulle nou kom dan kan jy, jy kry voorkeur omdat jy die werk alreeds ken en gedoen het. // He pretty much enjoyed it especially because the money helped him so much, but then it was also only for that month and then they had to come back again [back home], and they earned enough money there. They didn't expect it would only be a month, they [the IPP] promised that if they [her brother] come now [return to create more employment] then you can, you get priority because you already know and have done the work. (Emmie, interview, April 2018).*

The following quote from my interview in 2017 with a Emthanjeni municipal official captures the disappointment he felt when it became clear that the renewable energy plants would not bring significant permanent employment opportunities to the municipality:

The development of solar...left us with a huge gap that was not filled. People expected from now onwards we'll be really having jobs because they saw it as a development that could create permanent jobs, but it didn't go there. If its [permanent jobs created by solar development] 15 ... [it] will [be] many. I believe they're 15 or less (Daniel, interview, October 2017).

A year later the IDP officer expressed similar views: *'Hulle verander nou nie De Aar nie, dalk een of twee huishoudings, so drie. // They do not bring change to De Aar, perhaps one or two households, maybe three [benefit]'* (Cobus, interview, April 2018).

The LED manager was not far off with his estimate. In 2014, De Aar Solar Power stated on their website that they had created 20 permanent jobs. According to the IPP employee I interviewed there were never any promises from their side that more would be forthcoming:

*Ons is van die begin af openlik gewees met hulle en gesê waarvoor ons hier is en dat dit 'n projek is en dat dit, dis nie 'n long term sustainable projek of job*

*opportunity nie, dit is net ons gaan hier vir 10 of 12 maande tops wees, en die meeste waar ons regtig 'n impact gaan maak is deur onse economic development programme. // We have been open with them from the beginning and said what we are here for and that this is a project and that this, it's not a long-term sustainable project or job opportunity, it's just that we're going to be here tops for 10 or 12 months, and the most where we will really make an impact is through our economic development programs (Patrick, REIPPPP employee, Interview, April 2018).*

The general figures provided by the IPPS themselves are much higher but need to be treated with caution. Solar Capital (2016) provided a figure of 'employ[ing] over 2,000 local people at peak and currently employ[ing] approximately 100 people for operations and maintenance' The majority of job opportunities according to them were created during the construction phase between 2013 and 2014. These jobs were also part-time and with the company Costruzioni Moncada South Africa, a subsidiary of Moncada Energy Group, an Italian renewable energy developer. According to a report by the Public Investment Corporation (2018:1), in the first phase of development (Solar Capital 1) 248 people were employed of whom 203 were men and 45 women. According to Wei Chen, the general manager of Longyuan South Africa Renewables (Longyuan SA), they employed more than '1 000 local' people during the construction phase of the two wind farms in 2017 (Longyuan Mulilo De Aar Wind Power Project in South Africa starts operation, 2017). However, this statistic is contradicted by media reports that state that only 700 jobs were created, some of them 'indirectly' (Longyuan SA launches two projects in province, supporting power demand and creating jobs, 2017). Wei Chen's claim is also refuted by a local farmer who told me that the construction and engineering company Murray and Roberts, was contracted to build the two wind farms and they brought in their own team of workers (Jaco, interview, April 2018).

Longyuan has also brought in Chinese nationals to run its wind farms. During my tour of Longyuan Mulilo's substation outside of De Aar in 2018, I was able to observe that all the signs in the corridors, on doors and in the recreation, room were in Mandarin. When I asked my unofficial 'tour guide', a South African engineer, why this was the case he told me that it was because Chinese nationals were being brought to De Aar to run the wind farm. These nationals were mainly engineers. A farmer confirmed that the majority of the maintenance staff at the two wind farms in De Aar are Chinese nationals (Jaco, Interview, April 2018). They rotate on a three-month basis, spending three months in De Aar and

then three months back home in China. None of these figures could be confirmed as these IPPs were not forthcoming with their data. Figure 8.1 shows the entrance to the Longyuan Mulilo De Aar Wind Power substation.

Figure 8.1: Longyuan Mulilo De Aar Wind Power substation entrance, 2018



Photographed by Stephanie Borchardt, April 2018

The Foundation for Alcohol Related Research (FARR) manager in the Northern Cape was, however, more positive about the impact on local employment. She acknowledged that the initial surge in jobs shrank after 2013/2014 but felt some longer-term employment opportunities had remained: 'Yes, unfortunately, that's left now, but it's [employment in De Aar] not down to where it was back in 2010' (Interview, April 2018).

## 8.2 Local enterprise development

In the following section, I draw mainly on interviews with local municipal officials from the Emthanjeni Municipality. The officials all agreed that the municipality was initially optimistic once they heard of the development opportunities the renewable energy companies would bring to the town. However, they became far more critical of the REIPPP programme once construction started. The initial optimism of potential spin-offs quickly faded as they realised local benefits would be few and far between, with people from outside the town

often first in line, one municipal official was furious that one of the renewable energy companies had hired an 'outside' consultant to help them plan their SED and ED development initiatives instead of drawing on local expertise:

They contracted [company name]. That [company] is driven by a woman from Cape Town. She's not moving [to De Aar], but she came to establish her own business. Who is this [company]? Where does this ... woman come from? ... She's also a white woman from Cape Town (Daniel, interview, April 2018).

The company in question is a business based in Cape Town that offers printing and internet services. The official regarded this as one of many instances in which the IPPs side-lined the local community and disregarded the expertise in the municipality. He stated that nobody from any of the IPP's had ever contacted him with regards to local development needs. A 2015 desktop study by Wlokas found this to be general problem:

Very few project companies chose to consult with the Local Economic Development (LED) unit. This unit has the Government mandate to develop the local economy including measures to support small and medium enterprises and job creation. This unit should be crucial for IPPs to consult and involve when recruiting workers during construction and also in the planning and implementation of local community development investments (2015:36).

When I asked one of the local municipality officials responsible for 'local economic development' if he thought that the renewable energy companies provided benefits to the locals, he groaned and stated, 'It's zero to minimal ...you can call it a zero-point zero whatever percentage'. (Daniel, interview, October 2017). According to him the municipality had approached the renewable energy companies to work with them and fund two projects but were met with refusal. He was also critical of the IPPs for being ignorant about local political dynamics:

They [the IPP's] have actually disappointed us, but it's fine...Then we realised to say no, they are focusing on one side of a certain community and...so far they are doing their own thing, but I think they will be at loggerheads with the community very soon. Because all their mistakes are mentioned in committee meetings, and we cannot defend them. But we [the municipality] will only react when it comes to

a push, then we are going to say, we've been watching you (interview, October 2017).

When questioned about the 'certain community' Daniel singled out one of the renewable energy companies for only focusing on the 'coloured' community in De Aar which he considered was likely to exacerbate racial tensions in the town.

However, the IPP employee I interviewed also pointed to the challenges faced by the IPPs in of negotiating the politics and internal hierarchy within the municipality: '*Meeste van die tyd, ons word...deur hulle encourage om van bo af, jy weet, om protocol te volg wanneer ons kommunikeer. As jy dit nie doen nie is daar ook probleme. // Most of the time, we are...encouraged by them to [work] from the top, you know, to follow protocol when we communicate. If you don't do that, there are also problems'* (Patrick, Interview, April 2018).

From his perspective, rebuilding trust with the local community after the protests of 2013/14 was also a slow business. Adding to the problems was the ignorance among would-be contractors about what was involved in running a small business and their lack of capacity to take on the required work:

*Ons moes baie met hulle gesels, en ons kon hulle toe op 'n punt bring waar hulle verstaan... want van die ouens het nie geweet hoe om invoices te maak nie. Hulle het nie eens geweet daar is goed soos HIV polities en goed wat jy moet het, en...so, toe moes hulle guide. Wat ons toe gesê het was hoe ons julle kan help is om met onse ekonomiese ontwikkeling funding kan ons julle help om julle besighede beter te maak. En van daar af het ons begin 'n paadjie stap met hulle. As hulle dan hulle eie besighede het dan kan hulle werk, so toe het ons hulle toe geleer om hulle besigheidsplanne op te trek en om hoe te comply en so met regulasies en goed. Ons het hulle op die kursusse gesit en so. So, van daar af het dinge begin, hulle het begin uitvind dat hulle kan ons eintlik vertrou, en ons wil help. // We had to talk to them a lot, and we could bring them to a point where they understood... because some of the guys [local business and contractors] did not know how to make invoices. They did not even know there were things like HIV policies and things you should have, and ... so, then we had to guide them. What we said then was how we can help you is that with our economic development funding we can help you make your businesses better. And from there we started walking a path with them. If they then have their own businesses then they can*

work, so then we taught them to draw up their business plans and how to comply and so with regulations and stuff. We put them on the courses and such. So, from there things started, they started finding out that they can actually trust us, and we want to help (interview, April 2019).

The entrepreneurship programme Patrick has been overseeing focuses on training people to start their own businesses. Those wanting to participate have to first submit a business proposal for funding to the value of R20 000 from the renewable energy company's enterprise development programme. Those that submit a proposal are also expected to attend training courses which is where, according to Patrick, most people drop out as the training takes more time and effort than they were expecting and prepared to invest. Successful completion of the training was also not guaranteed:

*Van hulle het actually along the way uitgeval ...maar soos dit is met al onse kliënte wat ons mee, veral in entrepreneurship. Die ouens het maar hulle eie agendas, jy weet. Baie is oor die feit dat hulle desperaat is en hulle wil maar net werk het... Nie almal is suksesvol nie. Ons moet realisties wees, maar daar is 'n paar wat al ander mense kan employ. // Some of them actually fell out along the way... but as it is with all our clients we work with, especially in entrepreneurship. The guys have their own agendas, you know. Many are over the fact that they are desperate, and they just want to have a job. Not all of them are successful. We must be realistic but there are a few that can employ others now (Patrick, interview, May 2021).*

One of the Kareeville residents I interviewed, Alexander, attended workshops as part of a small business entrepreneurial course and spoke positively about the experience and what he had learned (Interview, April 2018). At the time when I interviewed him, however, he had not acted upon the training. (See Appendix 24 to view the business training advertisement and training material provided to those enrolled into the programme.)

A proper evaluation of the enterprise development programmes is beyond the scope of this dissertation, but the above account suggests that the results have been limited at best. Janice, a senior development worker at the Ethembeni Trauma Centre, felt that the emphasis on creating entrepreneurs is actually misplaced and blames the national government for emphasising this above other development needs:

*As hulle monde oop gaan is dit entrepreneur, maar dit gaan mos nou nie werk nie, ons almal is nie skilled om besigheid te run nie en watse besigheid nou nog in De Aar? Wie gaan by my besigheid koop as die mense werkloos is? // If they [national government] open their mouths, it's entrepreneur, but it's not going to work, we're not all skilled to run a business and what business is there in De Aar? Who will buy from my business if the people are unemployed? (Interview, April 2018).*

### **8.3 Socio-economic development programmes in De Aar**

The information I was able to gather on the SED projects in De Aar showed similarly mixed results. In Kareeville itself, as already discussed, few of the people whom I interviewed through the survey and in the follow-up, interviews were well informed about the REIPPPP's SED and ED programmes and even fewer had directly benefitted themselves. Three people mentioned the Wi-Fi hotspots that the REIPPPP had provided at schools and spoke positively of the Community Centre sponsored by Solar Capital. One participant (Alexander) mentioned the business training offered at the community centre, two people mentioned the computer classes available at the same centre and another mentioned the driving lessons also offered from this centre. These projects are discussed below.

#### **8.3.1 Education projects**

Education is singled out as a focus area for SED under REIPPPP and support for projects in the education sector is something that all three IPPs operating in De Aar have been ready to take on. The attraction of these projects for the IPPs is that they clearly meet their scorecard requirements, often involve tangible items that can be reported on easily, such as computers, and take place in an environment that is reasonably organised (schools). Table 8.1 provides information on the school-oriented socio-economic development projects and activities supported by the three renewable energy companies in De Aar, as reported in my interviews with the IPP representative and a knowledgeable NGO staff member.

Table 8.1: IPP funded school programmes in De Aar

<b>Renewable energy companies in De Aar</b>		
Sibona Ilanga trust (Globeleq-De Aar Solar Power)	Solar Capital	Longyuan Mulilo
Provide support to Creche's as part of the Creche support programme which focuses specifically on early childhood development	Installation of 20 wireless network hotspots at schools (14 of these hotspots are at schools).	Briefing to high school students of the opportunities that are provided through the Mulilo Bursary Fund and funding successful applicants.
Funding for mathematics and science programmes at the secondary schooling level.	Establishment of a computer centre for learners at the Solar Capital community centre, with training in use of tablets plus access to computers and the internet for school projects.  Adult computer literacy classes are also provided	Funding for site excursion for Grade 12 learners from local high schools. The site visits include a visit to the wind farm to experience the scale of the project. In addition, the learners will also engage in educational activities.
	Learner licence and drivers programme	Created an initiative with the Afrikaanse Taalmuseum and Monument, aimed at schools and communities where there is a need for the provision of reading books, reading facilities and storage for books to the community.  Mulilo has partnered with the KET Foundation, a De Aar-based non-profit organisation (with 81% 'black' beneficiaries). The focus is on creating development opportunities for children from underprivileged backgrounds by providing assistance in education, sports, and recreational initiatives.



### 8.3.2 Solar Capital's Community Centre

This Centre represented a significant investment by Solar Capital that regrettably is no longer operational; unpacking the full story behind this, which I have not been able to do, could be important for a fuller understanding of the challenges and limitations of this kind of REIPPP project. This initiative appeared very promising when I first visited the Centre during my scoping fieldtrips in 2017. To a researcher such as myself, Solar Capital's Community Centre appeared as a flagship programme that was being used and gave the sponsoring company a significant presence in the town. As previously noted, its location in De Aar East played a part in my choice of Kareeville as my primary research site. However, the centre subsequently ran into difficulties, in part because of a contractual disagreement but also because of the COVID-19 pandemic, and in 2020 it closed.

Solar Capital is the only company to have built a community centre with offices for its ED and SED employees. The Centre was a very visible point of interaction between the IPP and local people, particularly the youth whenever I visited it. Figure 8.2 shows the main hall with its colourful posters and banners advertising various programmes funded by the IPP's SED and ED programmes in April 2017.

Figure 8.2: Interior of the Solar Capital Community Centre, De Aar, 2017



Photographed by Stephanie Borchardt, September 2017

The brightly lit hall greeted members of the community and offered space for various interactive courses and entrepreneurship training programmes. Across from the main hall was a computer lab with numerous computers for use and a whiteboard. According to Solar Capital (2022) their total investment into the computer lab amounted to R700 000. The lab was open every day of the week from 9 am to 5 pm. An assistant was there to help residents with any computer difficulties. Local people benefitted from the free computer-skills training courses that the assistant ran but were not required to take the courses and could also make use of the facilities for recreational purposes and to type documents, create PowerPoints and write and print their CVs. The atmosphere at the centre when I first visited it in September 2017 and subsequently can best be described as bustling. Outside the Centre it was also busy, with people checking out what was happening inside, sitting on the benches provided or standing around chatting, many glued to their cell phones as they took advantage of the free Wi-Fi network which the Centre provided. In the parking area there was a trailer which housed a state-of-the-art virtual driving centre where learner drivers could hone their skills without having to have a car. This is shown in Figure 8.3 below.

Figure 8.3: Driver training centre, Solar Capital Community Centre, 2018



Photographed by Stephanie Borchardt (April 2018)

The driver trainer programme was fully funded and featured both off-road training in the virtual centre and on-road driving lessons. Solar capital also provided a vehicle (shown in figure 8.4 below) which allowed students without access to a car to be trained by a certified driving instructor.

Figure 8.4: Learner driver's vehicle sponsored by Solar Capital, 2018



Photographed by Stephanie Borchardt, April 2018

One of my Kareeville informants who was positive regarding the REIPPPP frequented the Community Centre regularly and completed her driver's license through the training programme. This is an example of a significant individual benefit that is hard to quantify or assess in relation to the depths of the development backlog in a place like Kareeville. When I did my follow-up interview with Claudia she was living with her husband and three children aged six, ten and eleven in a standard four-roomed house in Kareeville. At the time I interviewed her both she and her husband were unemployed and dependent on child support grants for their three children, but she was studying and had received a bursary (not from the IPP's) to complete her degree. She was very positive about Solar Capital's contribution to the community:

*Ek was al daar, ek het nou onlangs my lisenste en leerders goed daar gedoen, dis 'n free program wat hulle gedoen het...en daar is computer kursusse wat hulle aanbied, daar is business vir as jy 'n besigheid wil begin. Hulle het dan geld vir mense ge-sponsor vir besighede, en daar is mense wat nou in besighede is deur Solar Capital. Hulle het 'n positiewe impak in die gemeenskap. // I've been there [at the Solar Capital Community Centre], I recently did my license and learners' stuff there, it's a free programme they did...and there are computer courses they offer, there's business for if you want to start a business. They then sponsored money for people for businesses,*

and there are people who are now in businesses through Solar Capital. They have a positive impact in the community (interview, April 2018).

A more cautious evaluation of the contribution of initiatives such as the drivers' training programme came from a staff member at the Ethembeni Trauma Centre who acknowledged that it was a good initiative but was not sufficient to 'uplift' the community; what was most urgently needed was work:

*Dit help vir die skills maar as daar nie werk is nie dan baat dit nie...Ek dink wat De Aar moet op focuks is 'n fabriek wat kan uitvoer en invoier wat sustainable is wat die gemeenskap kan uplift...nie wat vandag opstaan en more is hy weg. Want dit is wat heir gebeur. // It [the IPP SED programmes] helps for the skills but if there is no work then it is of no use... I think what De Aar needs to focus on is a factory that can export and import, that is sustainable, that can uplift the community... not what gets up today and tomorrow it's gone. Because that's what's happening here [with the SED and ED programmes] (Janice, interview, April 2018).*

Her scepticism could be seen as vindicated by the subsequent demise of the Community Centre. In 2021 when I was able to return to De Aar after COVID-19 lockdown restrictions on traveling were lifted, I visited the Centre to find that it had been closed. As can be seen in Figure 8.5 below, all the signage had been removed, the paving to the entrance was overrun with weeds and tall grass, and many of the windows were either broken or cracked. The Virtual Training Centre for learner drivers was no more.

According to my IPP informant (Patrick, interview, May 2021), they had lost the site for the Community Centre because the owner of the building had ended their lease, for reasons that I have not been able to establish. As they no longer had the Community Centre premises, they decided to shift their computer training programmes to a mobile computer lab while the driver training programme was moved to Britstown. I was assured that the Centre had not been shut down due to the COVID-19 pandemic but that seems to have played some role, as Patrick noted that from 2020 and especially with the COVID-19 lockdown, vandalism and theft had increased greatly in De Aar. He spoke of the hostile and 'desperate' environment that they were experiencing in De Aar as factors behind their decisions. When asked if he thought local residents had appreciated the Solar Capital Community Centre, he responded that he felt that it was only appreciated by individuals

and, furthermore, 'You're only as good as your last game to them' (Patrick, interview, May 2021).

Figure 8.5: Photograph of the Solar Capital Community Centre, 2021



Photographed by Stephanie Borchardt, May 2021

## 8.4 Community trusts

The community trust is an important feature of the REIPPP programme. According to Eberhard and Naude:

The REIPPPP aims to direct development to previously marginalised and disadvantaged groups, and communities. Ownership is intended to provide a flow of economic benefits as well as identified parties with voting rights in some cases, which allows them to directly influence project activities (Eberhard & Naude, 2017:114-115).

IPP's are contractually obliged to create local ownership in their solar or wind farm projects and use the trust mechanism to do so. The trusts are set up as shareholders in the project,

their portfolio of shares generally bought with loans from funding agencies such as the Development Bank of South Africa. The minimum threshold as prescribed by the IPP programme is that companies must provide a 2.5% share in each project. According to Overy (2018), the great majority of trusts established through the REIPPP programme have exceeded this minimum threshold, which is the case in De Aar.

According to Nzo:

There is a set of criteria that takes into account minimum competency of applicants such as skills, experience and education, which is followed by a vetting process for a criminal record for the shortlisted candidates from the communities. Once community members have been shortlisted, communities are given the option of voting for two community trustee candidates. The shortlisted candidates are given an opportunity through community meetings, to present themselves and convince communities that they should elect them as trustees (2021:61).

Once elected the trustees meet once every quarter and they are guided by a deed as set out by the IPP that highlights their role in the trust, their responsibilities, and the governance functions of the trust.

As the discussion of the capital accruing to the trusts that are operating around De Aar show, the capital that will accrue to these community trusts over the lifespan of IPP projects are significant, especially in the context of financially struggling local municipalities. How these trusts decide to fund programmes and individuals is not clear, even with the requirement that they target education, health, and cultural needs. However, the degree of accountability to and engagement with local communities through public consultation is questionable. Not only would such public consultation respect the agency of local communities and empower them by providing them with a voice over projects planned to benefit them, but it would also allow local communities to hold the IPPs themselves to greater account, as shareholders. A further issue that arises concerns the lack of coordination among them in terms of the projects they choose to support.

While there are only three IPP companies in De Aar, there are six separate solar and wind farms, all six of which must ensure a minimum of 2.5% local ownership through the trust mechanism. The REIPPP community ownership investments in De Aar can be seen in Table 8.2 below. A smaller 10MW solar farm, built by Mulilo but not part of the REIPPP

so independent of its reporting requirements, has also established a community trust which is included in the Table (Mulilo Renewable Energy Solar PV De Aar).

Table 8.2: REIPPP community trust commitments

REIPPPP	Ownership	Trust name
De Aar Solar Power	8 %	Sibona Ilanga Trust
Solar Capital De Aar	5 %	Solar Capital De Aar 1
	18%	Solar Capital De Aar 3
Longyuan Mulilo Wind Farm(s)	12.5%	Mulilo De Aar 2 North Wind Community (Pty) Ltd
	12.5%	Mulilo De Aar Wind Community (Pty) Ltd
Mulilo Renewable Energy Solar PV De Aar	20%	Mulilo De Aar Solar Community Trust

Source: Overy (2018:32-59)

The limited information I was able to put together on each of these trusts is presented below.

#### 8.4.1 De Aar Solar Power

As mentioned in Chapter One, De Aar Solar Power is run by a British-owned company called Globeleq. The company has established its trust to provide funding to non-governmental organisations that are registered as public benefit organisations.<sup>57</sup> The trust is called Sibona Ilanga Trust and was established in 2012, although trustees were only appointed in 2015. The trustees comprise a chairperson, one trustee appointed by De Aar Solar Power, one independent trustee, and one elected community member. During my initial visit to De Aar, I encountered the previous Economic Development Manager of Globeleq who, I discovered, is now the independent trustee on the Sibona Ilanga Trust, and told me that she would not be available to be interviewed as her contract had expired with the company. She noted that ED managers sign three-year contracts with the company. This was confirmed by the manager of an IPP in De Aar (Matthew, interview, April 2018).

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<sup>57</sup> NGOs must be registered with SARS (South African Revenue Service) to be eligible for funding.

According to its website, the purpose of the Sibona Ilanga Trust is:

to strengthen communities to be able to better manage social inequalities, whilst enabling access and funding to programmes that improve the standard and quality of life, of all people, in the targeted communities. The Trust partners with organisations that boost social development and unity as well as assist in the advancement of the disadvantaged. (Sibona Ilanga Trust, 2022).

The Trust has an 8% ownership stake in the solar farm which is much higher than the minimum 2.5% stipulated by the REIPPPP regulations. According to a report by Intellidex (2022:46), the Trust only started funding community projects in 2019. This was because it had first to use its dividends to pay back the loans, they had received from development finance institutions and the Development Bank of Southern Africa (DBSA) to purchase their original shares in the renewable energy plant. In 2019, the Trust granted almost R6 million in funding to 22 different organisations and initiatives (Sibona Ilanga Trust, 2019). This is a substantial amount of money, especially if coordinated with the community-directed funding of all the renewable energy trusts in the local municipality, could make a meaningful contribution towards satisfying human needs and advancing social justice. According to the Sibona Ilanga *Trust's Annual Report for 2020*, as of 28 February 2020 it had received a total of R82 million from the solar farm as capital for its SED and ED programmes.

On their website, the Sibona Ilanga Trust (2022) states that it focuses their funding on the following four areas: food, education and life skills, market and enterprise development, and tertiary education. They support community-based initiatives that provide nutrition to those in need and also focus on early childhood development (ECD), through numeracy and literacy interventions at primary schools, providing support for science and mathematics programmes in secondary school, and run a scholarship programme aimed at engineering related studies at the tertiary level.

#### 8.4.2 Solar Capital Community Trust

The Solar Capital Community Trust consists of five members of which three are independent trustees and two are community trustees (Nzo, 2021). No information related to the trust appears on the company's website and I was unable to track down additional information myself.



### 8.4.3 Longyuan Mulilo Trust

Longyuan Mulilo, the only wind farm IPP in De Aar, has a similar trust structure to the Sibona Ilanga Trust, consisting of one founding trustee, two independent trustees, and a community-elected trustee. From what can be seen on their website and social media platform, the trust also concentrates on schools in the area. The ownership share of the trust is relatively high, at 12,5% but it appears that this is because the company is running its own SED and ED commitments through the trust. Interestingly, the company has published a document stipulating which groups and/or activities are not eligible for funding; these include 'partisan' and 'cultural' events, religious organisations and 'large infrastructural projects' as follows:

... individuals or small groups acting in their personal capacity, political parties or groups with partisan political affiliations; labour unions; conferences; video and film productions; cultural exhibitions or once-off cultural events, generalised fundraising circulars or events such as fundraising dinners or golf days; religious organisations (other than community outreach) including the construction and maintenance of places of worship; overseas tours and exchanges; and lastly large infrastructural projects e.g. dams, roads, and water being undertaken by Government (Mulilo De Aar Solar Community Trust, Community Trust Development Programme Deed)

The last sentence is of particular importance as it would appear to rule out funding projects that could bring renewable energy to poor communities such as Kareeville, for instance through a roof replacement project and the provision of rooftop solar geysers. I question why a renewable energy company cannot use its SED and ED programmes to assist people to meet their energy needs. As examined, in Chapter Five, the local municipality is in dire need of infrastructural upgrades but does not have the funds or the expertise to maintain and expand its electricity network. Furthermore, while the Emthanjeni Local Municipality has provided solar home systems to some indigent households in the municipality, even once all qualifying households have been assisted in this way, the majority of households who are poor but not considered indigent because their monthly income exceeds the official threshold could benefit greatly from such an initiative. Funding for such projects would reach large groups of people and not limit the impact to individuals.

It should be noted that Droogfontein Solar Power, a Solar Capital project located in the Sol Plaatje Municipality, has funded infrastructure projects such as the roll-out of solar home systems to local communities in Kimberley (Globeleq, 2018). In addition, there the IPP also trained individuals to install and maintain the solar home systems as a way of securing long-term employment opportunities for these individuals. There is thus no legal bar placed on larger infrastructural investments by the REIPPP programme but for reasons I have been unable to explore the Mulilo Trust has decided that it will not fund such projects.

## **8.5 Challenges and limitations of the community development projects around De Aar**

In this section, I reflect further on major challenges facing SED and ED programmes in De Aar. Significant here are the miscommunication and mistrust affecting relationships between the various IPPs, the Local Municipality and local residents. Additionally, differences in agendas both political and individual hamper the effectiveness of the implementation of the various programmes.

### **8.5.1 Poor communication, lack of coordination and mistrust among IPPS**

As described above, the renewable energy companies failed to establish effective working relationships with the local municipality. The municipal officials I was able to speak to all felt that the communication between the companies and themselves was lacking and should be improved. While complaining about the lack of communication, some officials did acknowledge that the renewable energy companies were making some contribution, including through their economic development programmes in the town. However, they felt that the impact would be far greater if the IPPs were prepared to collaborate with the municipality. At the same time, municipal officials were also ignorant about the mandate and operations of the REIPPPP. For instance, officials with whom I spoke were aware of the local ownership requirement for IPPs and that this was being achieved through the community trusts but had no idea how they functioned. One official equated the trust with a bank account where locals could withdraw money for individual projects (municipal official, interview, April 2018).

The poor communication and lack of coordination among the IPPs was a point of contention that emerged in my interviews with various stakeholders described above. The mistrust among companies spilled over into competition among the companies and unfortunate overlaps in the local community development projects they supported. According to Eugene, the companies view themselves in competition with one another:

*Kyk, hulle wil nou nie almal saam onder een dak kom vergader nie en hoor die een wil dit doen, die een sê dit...nee, hulle kompeteer met mekaar. Ons vra asseblief sit saam, maar dis nie hoe hulle dinge doen nie. // Look, they do not want to all meet together under one roof and hear this one wants to do this [for the community], this one says this... no, they compete with each other. We ask them, please, sit down together, but that is not how they do things (interview, April 2018).*

Patrick was particularly frustrated by the lack of coordination and cooperation amongst the various renewable energy projects in De Aar:

*Daar is net nie 'n interest in [saam werk nie]...weet jy, persoonlik glo ek dat dis dat nie almal het dieselfde passion vir die gedeelte van die werk nie, want dis nie die core function van die company nie, maar hulle is verplig om dit te doen. So, ek voel dat hulle glad nie...jy weet, dis nie vir hulle belangrik of so nie, en vir daai rede sit 'n mens maar. As ek sukkel om te kyk hoe hierdie ding, hoe moet die gemeenskap nie? Die gemeenskap is die groot ding. Maar ek is altyd oop vir dit, en ek glo dat ons ... om saam te werk sal ons...want die is die een gedeelte, dis een component van die renewable energy program waar ons nie competitors is nie, ons is dieselfde. // There is just no interest in [working together] ... you know, personally I believe that it's that not everyone has the same passion for this part of the job, because it's not the core function of the company, but they are obligated to do it. So, I am feeling they are not at all ... you know, it is not important to them or something like that, and for that reason, one just has to sit back. If I'm struggling to see this thing, how could the community not? The community is the big thing. But I am always open to it, and I believe that we ... to work together, we will ... because that is the one part, it's the one component of the renewable energy programme where we are not competitors, we are the same (interview, May 2021).*

Patrick provided the following example of an unsuccessful attempt to collaborate with one of the other IPP companies. According to him, during the COVID-19 pandemic the clinic

in Nonzwakazi township in De Aar was struggling to cope with the demands of all the sick patients who were turning to it for care. He was approached by the ED /SED representative of one of the other REIPPPP companies to collaborate in funding a supply of personal-protective equipment (PPEs) and storage container for the clinic. He was excited to collaborate and started phoning around for quotes and trying to see how he could take the collaboration forward. A few days later, he received a phone call from the IPP representative with whom he was supposed to be collaborating who asked him if he had already delivered the container, as the clinic had just phoned the caller to thank him, even though they had not yet ordered anything for the clinic. According to Patrick he was shocked and had to convince his caller that he had not yet ordered the container so therefore none of the goods received by the clinic could be attributed to his IPP. Patrick was disappointed, not only because the opportunity to collaborate was over but also because he and the other IPP employee had wasted their time, without being aware that yet another benefactor was involved. He suspected that the container and equipment had been donated by the third renewable energy company operating in the municipality.

#### 8.5.2 Over-extended LED managers

Patrick spoke of the enormous pressure under which he was expected to perform by his company's board members: 'Hulle *dump net alles op jou* // 'They just dump everything on you' (interview, May 2021). Patrick spoke of previous ED and SED managers who could simply not cope with the workload. According to him, on average people in these positions stay for no longer than two years. One of the pressure points is the distance that managers who are based in Cape Town have to travel as they move back and forth between Cape Town and De Aar:

*Die ouens het min tyd. Hulle word gedrill. Die mense hou nie lank nie, hou net vir 2 jaar want dan is hulle weg. Hulle is nie bereid om die ED department te expand nie. So hulle gaan vir jou n groot paket aanbied maar dan moet jy weet jy gaan moet moet alles doen...travel, baie baie travel. Die [person at company X] ...hulle het besluit hulle wil in die kantoor sit in Kaapstad. Want hulle kannie so aangaan nie en hulle is net nooit beskikbaar nie. Hulle was constant op die padgewees. Selfs die virtual goed... ons is net nie available nie. // These guys have little time. They are being drilled. The people don't last long, only last for 2 years and then they are gone. They [the company] are not willing to expand their ED department [by employing more people]. So, they are going to offer you a big package but then*

you have to know that you are going to have to do everything... travel, lots, and lots of travel. The [person at IPP X] ... they decided they wanted to sit in the office in Cape Town. Because they can't go on like this and they're just never available. They were constantly on the road. Even the virtual stuff [for meetings] ... we're just not available (interview, May 2021).

In Patrick's case he decided to move to De Aar and resides there permanently, so this burden was removed.

Patrick states that while most of the ED and SED managers from the various wind and solar farms in De Aar had power in terms of signing rights on million Rand contracts, they were carefully being watched by their company's board members. He believes that ED and SED managers do not have as much freedom with regards to their programmes as people think. Patrick mentions that he was warned against underspending as the companies could carry serious consequences if they underspend: *'Jy kan imagine, hoe kleiner 'n dorpie is en hoe kleiner jou area is wat jy kan in spandeer, as daar so baie companies is en ons het almal dieselfde targets...dit kan 'n competition raak. // You can imagine, the smaller the town, the smaller your area is that you can spend in. If there are so many companies [in one place], and we all have the same targets...it can become a competition'* (interview, April 2018). Patrick therefore felt compelled to spend money on as many projects as possible.

Some of the companies have tried to lay claim to certain non-governmental organisations in De Aar forcing other companies to approach NGOs in nearby neighbouring towns. The companies also tried to 'capture' certain residential areas and targeted key areas such as the early childhood development (ECD) phase and primary schools in De Aar. When asked why some IPPs are less visible in De Aar than others, Patrick commented, "I think they are scared of the community because the community can be aggressive in their needs". This to him was however not an excuse as he believed other IPPs do not view the SED and ED programme, as mandated by the REIPPP programme, as that important:

*Daar is ook companies' wat voel hulle het hulle eie dinge. Dit is nog vir hulle 'n boksie wat getick word. Dis nie hulle core business nie. Hulle word geforce in dit in. So, hulle sal okay wees om 'n klomp toys af te gooi by a creche en dan weet hulle nie eens hoe lyk die creche binne nie. // There are also companies that feel they have their own things [to focus on and fund]. It's still a box for them to tick. It's*

not their core business. They are forced into it. So, they would be okay to drop off a bunch of toys at a crèche, and then they do not even know what the crèche looks like inside (interview, May 2021).

### 8.5.3 The impact of the COVID-19 pandemic

The global pandemic further hindered non-governmental organisations in De Aar from assisting the community. A staff member of an NGO, Frederick, funded by all three renewable energy companies noted that their workload has increased threefold with the pandemic. At the same time, the funding priorities of the IPPs shifted in response to the pandemic, even though the NGO's regular programming was still in urgent need of support:

In terms of resources [for the centre], it has gone down, I understand money went to PPEs, but they forgot things still need to go on... HIV, TB, an increase in gender-based violence goes on in these communities. We are more busy with these issues now than pre-COVID. We have applied to Solar Capital, Sibona Ilanga Trust, and Mulilo [for funding]. Mulilo promised that they were here for due diligence. They would give us a response by month end March [2021], It's May [2021] and nothing has happened. We do not receive any emails that talk about their delays, and we started now with follow-up calls. Between April and May our people have not been paid. They are now volunteering their services and other modules cannot be implemented. We can therefore not reach our beneficiaries. With Sibona Ilanga [De Aar Solar Power], we had this agreement that they'll give us funding. It will be coming through in June [2021]. Internally they had a communication challenge in terms of funds. Their board needs to sit before we receive anything (Fredrick, interview, May 2021).

Frederick was anxious about their financial viability as a result of the pandemic as well as the added difficulty of securing funding during the pandemic that had been placed on staff members. While securing funding was always difficult for NGOs, the pandemic had exacerbated the situation and they had lost employees who had lost hope to continue.

During a conversation with one of the trustees from the Sibona Ilanga trust, Frederick mentioned how the pandemic could not take precedence over their existing courses and programmes designed to address HIV, TB, and gender-based violence and abuse in De

Aar (Interview, 04 May 2021). According to Frederick the trustee appeared to agree with him, which gave him hope when they applied for financial assistance in 2021 but, sadly, their application was turned down because the Trust had decided to focus on COVID-19 related expenditure at the time.

Sheila works for a non-governmental organisation in De Aar. They run a soup kitchen in five locations across the town reaching approximately 200 beneficiaries. According to Sheila, they were told by the Department of Social Development that they had to work from home due to the national COVID-19 lockdown in 2020. It was no longer possible to serve any of their beneficiaries and what further upset Sheila was that they received food parcels which they had to distribute: 'We have dishing points, the beneficiaries come with their plate, and they get a warm plate of food. But with the food parcels, you have to select households. How do you start to select when you know everyone is on their last?' (Sheila, non-governmental organisation, interview, 4 May 2021). Sheila also noted that they had to include another location in 2021 due to the growing unemployment around town: 'We have just added Waterdal, its white people staying there but they are in need'.

She was however thankful to one of the renewable energy companies that supported the NGO with funds to further purchase food hampers in 2020 and 2021. She also expressed her dismay at how severely their funding from one of the renewable energy companies had been cut. According to her, they received 83% less funding compared to 2019, a pre-COVID-19 year. What also troubled her was that the renewable energy companies were chose to support them by providing them with PPEs: 'We are drowning in PPEs, we have enough!' (interview, 04 May 2021).

Both Sheila and Frederick spoke of how the onus was on them to recruit funding from the IPP's socio-economic development funds. According to Frederick (interview, 04 May 2021):

The one guy from Solar Capital would call and say do you have any needs. Apart from that we have to call, we have to call Mulilo [Mulilo Longyuan], we have to call Sibona Ilanga [De Aar Solar Power]. One organisation said they would give us money for a programme, but they forgot the operational costs: salaries, catering ... so when we ask for money, we don't get what we asked for ... and further everything gets pushed back due to COVID. COVID-19 has now been an excuse.

While food hampers provided households with food supplies, the food would still require cooking. Maize meal was mentioned by both non-governmental organisations as a staple in all food hampers that were distributed in 2020. Yet, Kareeville households before the COVID-19 pandemic were struggling to afford enough electricity for all their cooking needs. The benefits of the distribution of the food hampers would therefore still have to be managed in relation to the pressure of securing energy on household budgets.

#### 8.5.4. Social ills

During my scoping trips in 2017 and in initial informal discussions with local townspeople I came across concerns raised around an increase in 'social ills' in the town that was attributed to the construction of the solar and wind farms. It must be noted that at the time of my scoping trip, construction on all the solar farms had ended while construction on the two Longyuan Mulilo wind farms had just begun.

A staff member at the Trauma Centre, a prominent NGO in the community, stated in an interview that they had seen adverse effects after the construction of one of the solar farms at the Center. According to this informant, alcoholism and violence had increased during construction phase as the people that were employed by the IPP could afford to consume more alcohol. According to her, the violence could also be related to infighting caused by unhappiness on the part of those not receiving employment on the solar farms during construction.

A municipal officer also expressed his frustration with the sudden influx of money and people to the town after the renewable companies started construction in De Aar:

We had this experience of crime that has drastically increased, even the usage of drugs increased enormously, and we started to experience drugs that we never heard about like your tik, your Mandrax (usually it was only dagga/Ganga)... after most of the jobs were declared redundant at the solar because the construction phase was over the majority of them have to go back to their cocoons and...the status quo remains...and people were still unemployed...when they still have income, they opened accounts with furniture stores, they opened accounts with clothing stores, food stores... All of a sudden, they don't have jobs, they don't have income, but they still have to pay debt. Now, is where they started to resort to



crime... It's only those with specialised skills that have jobs. The majority of people that we [the municipal officials] thought will be employed for the next five years are those that only worked for a year and a half (Daniel, Municipal official, interview, October 2017).

As illustrated by the quotes above, while both the local municipality and non-governmental organisations in De Aar were initially positive about the coming of the IPPs to their town, this perception started to shift as it became clear to them that few employment opportunities were available to residents. Furthermore, the influx of outsiders and foreign contractors to the town was associated with an increase in crime, alcoholism, and the illegal drug trade. Such concerns were fuelled in April 2014 when news broke of a rape that had occurred at one of the guesthouses in De Aar. According to Laganparsad (2014), a 16-year-old girl was raped on 5 April 2014 by several men aged between 24 and 47. All the accused were foreign nationals (Italian employees of Costruzioni Moncada, an Italian company that was subcontracted by Solar Capital to construct the solar farm) (Nzo, 2021:46). This incident heightened concerns around the negative social impact of the construction period. The men were charged and also immediately dismissed by their employer; unfortunately it has not been possible to establish what the outcome of the case was.

## 8.6 Conclusion

The REIPPPP'S SED and ED programmes reflect a recognition on the part of the state that the investment in renewable energy must be linked to local development in the areas where the infrastructure is being developed. However, as the above discussion has shown, the programmes have been designed and are being implemented in a top-down fashion without the involvement of or accountability to either the local municipalities tasked with local development and service delivery or ordinary residents who are meant to become shareholders through the Trust mechanism.

The problems discussed in this chapter are not so much a failure on the part of the IPPs but rather of the design of the state's REIPPPP programme. IPPs are required to fund SED and ED programmes but the way they have been conceptualised reflects a narrow

view on the part of the state with regards to how community development should be done. Despite the rhetoric, social justice and local participation are not core considerations. The emphasis is not on long-term sustainability but on short-term, easily measurable and reportable projects. National policy's failure to consider the impact the REIPPP programme would have on local municipalities and its disregard for the importance of fostering relationships between IPPs and the local municipality can also be seen as short-sighted.

The IPPs do not have to report to local government but, rather, report to the IPP office in Johannesburg and the DMRE, thus leapfrogging both local and provincial government. The REIPPPP is a nationally focused programme that is not responsible for addressing the many socio-economic ills of a municipality like the Emthanjeni Local Municipality. At the same time, while IPP's working around De Aar cannot be expected to solve the Emthanjeni Municipality's challenges, an opportunity to institute a more collaborative approach to local development was missed in the design of their ED and SED commitments.

The IPPs operating around De Aar do not have to answer to local authorities or communities if a SED or ED project is unsuccessful. The ED programmes of the IPPs have not been designed to assist local municipalities to meet their responsibilities but, rather, have emphasised the development of individual entrepreneurs. While a full evaluation of their programming has been beyond the scope of this dissertation, the views of informed local stakeholders on the effectiveness of the business training initiatives were largely pessimistic. As noted by one IPP representative, most people wanted the security of a job, not the risk of a small business.

As noted in Chapter Five, several municipal officials I interviewed mentioned their desire either to collaborate on community projects with the IPPs or at least communicate their priority areas to the companies for potential socio-economic development programmes. The IPPs, however, were reluctant to get involved in the politics and financial challenges of an unstable local municipality and sought to insulate themselves from sustained interactions with municipal officials. They face no risk if a local project that they fund succeeds or fails. They have contracted to spend a certain amount of money and fulfilling that obligation is the primary concern; this also helps explain their preference for funding short-term, quantifiable projects.

The Solar Capital Community Centre is an interesting example of a project that showed promise and appeared to be meeting a range of training and social needs in the community but was not institutionally embedded in the town and could therefore be unilaterally closed by its sponsoring IPP. At the same time the reports of vandalism targeted against the Community Centre point to the larger social ills in De Aar that need to be addressed and also undermine efforts at 'community development' in the town.

The mistrust I observed between the IPPs, and the local municipality extended to mistrust between the IPPs themselves who did not see the necessity to collaborate among themselves in the design and implementation of their projects but preferred to work in silos in order to meet their national contractual obligations. The lack of communication between various actors undermined the prospects for a potentially valuable relationship that could have improved the socio-economic status of the whole town rather than mainly benefiting a few well-placed individuals.

The community trusts have major funds available to them however the community is not involved in deciding where these funds are spent. The community is also not represented by the majority of trustees in each of the three IPP community trusts. The community trust could make a notable contribution towards upliftment in De Aar; however, they need to avoid the weaknesses that the IPPs ED and SED programmes have already revealed. I argue that community trusts must cooperate amongst themselves, collaborate with the Emthanjeni Local Municipality and be accountable to the local people who they intend to benefit i.e., the low-income and impoverished communities such as Kareeville.

From the perspective of most people in Kareeville, the ED and SED commitments of the renewable energy companies in their municipality were irrelevant to their lives, although a few residents were appreciative of certain projects. The projects that were supported in town, while making some contribution, only benefited a few. Investments in infrastructure that could be seen as falling within the scope of the renewable energy programme and could make an important contribution to the wellbeing and quality of life of poor households, such as securing the town's energy supply or providing affordable electricity or household solar systems were never on the agenda. IPPs operating around De Aar were not available to support the Emthanjeni Local Municipality with its solar geyser project, nor have they provided electricity to impoverished households through their SED and ED commitments. The renewable energy they generate is fed into a national transmission and distribution system, even though it is generated around De Aar, a

reminder of the significance of the MEC in South Africa in locking the development of the country's post-apartheid renewable energy dispensation into a national grid.

A renewable energy programme aimed at supplying the town directly with 'green' and affordable electricity could take the strain off the local municipality's finances with regards to its debt to Eskom and free up resources for other basic services. It would also provide a service to a larger proportion of the community by securing energy for the three towns and reducing unexpected power outages and interruptions due to failing infrastructure. Having access to a stable and affordable supply of electricity would mean one less concern for poor households, reduce the burden of poverty, and provide some of the preconditions for tackling poverty and marginalisation in communities like Kareeville. However, this would require a major rethink of how local municipalities' mandate and budgets, as described in Chapter Four, work.

The REIPPP projects in De Aar do provide electricity to the country at a time when the state utility, Eskom, is failing badly to keep up with demand; they are thereby helping address the national energy crisis in South Africa, albeit in a limited and constrained manner. Applying the notion of scale and the understanding of sustainable development represented in Holden et al.'s model to the REIPPP programme, it can be seen to be making a contribution to the need to address mounting global concerns around the environmental consequences of fossil fuels as the primary source of energy, while also addressing social needs nationally. However, the above discussion makes it clear that it is falling well short of meeting development needs at the local level.

## Chapter Nine: Conclusion

As noted in my introductory chapter, the underlying concern of this dissertation is with the potential of the ongoing investment in the renewable energy sector in South Africa to contribute to sustainable development in energy-poor households, with a specific focus on low-income households in localities which are hosting renewable energy projects. This, I have argued, is a neglected dimension in the current debate on a just energy transition in South Africa. In exploring this set of issues, this dissertation has addressed two overarching research questions: 1) What are the energy needs and challenges facing poor households in communities hosting renewable energy projects and 2) What contribution is the renewable energy sector making to local energy provision and social-economic development? Implicit in both questions is a concern with the extent to which poor households in the areas where the current investment in renewable energy infrastructure is unfolding in South Africa are benefitting, in terms of access to clean and affordable energy and/or the commitments from the renewable energy sector to sustainable development at different levels. These dynamics have been examined in relation to the significant national investment in renewable energy that is currently taking place in De Aar, as part of South Africa's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), a town where the local municipality is struggling to meet its responsibilities in the energy dispensation. The REIPPPP itself has been analysed in relation to the minerals-energy-complex (MEC) that has shaped South Africa's electricity dispensation.

To answer my research questions, I undertook a case study of household energy poverty in Kareeville, a low-income neighbourhood in De Aar, supplemented by research on both the local municipality regarding its socio-economic challenges and energy infrastructure issues and the contribution that renewable energy companies are making to local development in De Aar. I developed a mixed-methods research design which relied on both quantitative and qualitative research methods, the former involving a survey of a representative sample of 50 households in Kareeville to establish their energy needs and management strategies and the latter a range of methods that included in-depth interviews, observation, social media analysis, and policy and other documentary analysis. My study evolved over the course of five years in which time I was able to spend time in De Aar, interacting with local residents, local municipal officials, some NGO staff

members, and a couple of employees of the renewable energy companies investing in solar and wind farms around the town.

My concern with household energy poverty is located within a broader concern with the contribution of the not insignificant (though still constrained) investment in renewable energy since 2011 to sustainable development in poor communities such as Kareeville that so desperately need it. Working with the model of sustainable development put forward by Holden et al (2018), in which satisfying human needs, addressing social justice and respecting environmental limits are three non-negotiable moral imperatives that have to be addressed in tandem with each other, I have identified household energy poverty as a significant constraint on poor people's ability to achieve the capabilities that will enable them to live a healthy life of dignity and wellbeing. The extensive literature on energy poverty also alerted me to its gendered dimensions, which in my case study was entwined with generational tensions as well. The emphasis in this understanding of sustainable development on the importance of 'rich participation' and 'fair distribution' if development models are to be fully sustainable is compatible with the concepts of energy justice and energy democracy also found in the literature around energy poverty. At the same time, my emphasis on sustainable development also foregrounds the need for a holistic approach in which environmental limits are respected.

Aligning my tripartite model of sustainable development with an appreciation of the multi-scalar nature of the energy crisis in South Africa and the legacy of the MEC has assisted me in recognising the complexities of realising the potential of renewable energy to address development needs in a poor community such as Kareeville in De Aar, even though the town is a major hub for solar and wind farm development. The current REIPPPP has been designed in relation to an electricity regime centred on a national grid and a single national power utility, Eskom. As discussed in Chapter Three, the MEC has locked South Africa into an unsustainable pathway which continues to constrain the energy dispensation in the country. New ways of generating, distributing and paying for energy are therefore urgently required. However, while renewable energy clearly has a very important role to play here, its contribution to sustainable development at the local level cannot simply be taken as a given because of its contribution to national development concerns and to mitigating the global ecological crisis of climate change.

My fieldwork was disrupted and delayed by the onset of the COVID-19 pandemic and subsequent national lockdown but while this was an extremely stressful event to navigate

at many different levels, it did mean that I was able to observe developments in the town over a longer period than originally anticipated and also see the impact of an unforeseen event of this magnitude on a poor and struggling municipality. Despite various challenges in the field, the majority of the individuals I encountered were welcoming and helpful and without them my research objectives could not have been met. Unfortunately, with a couple of valuable exceptions, the management and staff of the IPPs operating in the Emthanjeni Local Municipality were not responsive to my requests for interviews and information, making it difficult to establish their thinking around their commitments to SED and ED in terms of the REIPPP programme. Officials at the IPPO also proved to be unwilling to share information that should be in the public domain. This point will be discussed further in relation to my recommendations in section 9.2.

In this concluding chapter, I first discuss my key research findings in section 9.1 and conclude with some recommendations for policy and further research in section 9.2.

## **9.1 Key findings and contributions**

My research has shown that energy poverty is severe in my case study site and that the Emthanjeni Local Municipality in which De Aar is located is a financially distressed municipality that is struggling to manage its electricity distribution responsibilities, including around revenue collection and servicing its mounting debt to Eskom. While the households in my case study are not absolutely destitute, unemployment levels are high, monthly incomes low and most households are struggling to meet their basic needs, including with regard to energy. Despite houses having an electricity connection via a prepaid metre they cannot afford to buy sufficient electricity during the month to meet all their basic daily needs for cooking, heating water, lighting and heating their living space when needed.

In response, households in Kareeville are employing a variety of strategies in order to meet their energy needs, including having to make use of alternative fuels such as firewood and paraffin, even though electricity is much preferred, limiting their choice of food and cooking, juggling their use of appliances, foregoing heating their houses in winter, going without electricity entirely until their monthly income improves, borrowing money to buy electricity and resorting to illegal connections and bribery in some instances. Here

household size, structure and income streams are also important variables. At the same time, while energy poverty is widespread in Kareeville, it is not spread equally or experienced in precisely the same manner across different households. With the majority of these households qualifying for the indigence subsidy; a very important subsidy to them, it is insufficient to meet all their needs and energy provision remains a constant pressure point.

More than two thirds of the households in my survey were found to be receiving the Free Basic Electricity subsidy, all of them positive regarding its availability. The provision of electricity to these households through the FBE subsidy is a lifeline but the monthly allocation of free electricity was, however, not enough to provide sufficient relief. The subsidy does not take household size into account and some electricity has to be purchased in order for a household to access the electricity that is described as 'free'. While Gaunt (2003) claimed this was in the interest of curbing fraudulent allocations, it also acts as a barrier to very poor households who struggle to claim the subsidy intended to be 'free'. At the time the FBE policy was introduced various analysts criticised the level of the allocation and the way this was calculated, with the needs of urban households not accurately represented (Gaunt, 2003; Dobbins, 2006; Adam, 2010). While at the time rural areas were found to be using less than 100 kw of electricity a month on average, consumption levels in urban centres were higher. The amount allocated to households in the early 2000s has also not increased to meet poor households' energy needs in 2022.

Bouzarovski (2015) has argued that electricity is an enabler of meeting one's broader needs and forms part of the capability set a person needs to live a meaningful life. I have also worked with the capabilities approach in my assessment of energy poverty, in alignment with Holden et al.'s endorsement of satisfying human needs as one of three 'moral imperatives' for development to be considered sustainable. As noted above, in applying these considerations to energy poverty, it is also important to adopt a gendered lens to ensure that women as the primary managers of household energy are empowered to exercise their responsibilities. As Petrova & Simcock (2021) and Clancy et al. (2004) among others have argued, women play a crucial role as primary caregivers in households and their empowerment is necessary in order to address energy poverty and poverty more generally.

My study has confirmed that in Kareeville the burden of securing and managing household energy is largely a woman's struggle as it is women who must juggle household income,



often relying only on social state grants, and make the difficult decisions on energy use and provision. The choices they are often forced to make, such as cooking on an open fire and gathering firewood, mean that women and female children often bear the brunt of the adverse health impacts of their 'choices' (Curses 2009:5). Having access to a stable and affordable supply of electricity would mean one less concern for poor households. It would reduce the burden of poverty and provide some of the preconditions for tackling poverty and marginalisation in communities like Kareeville.

With regard to the REIPPP programme itself, my findings on its contribution to local energy provision and social-economic development are that the contribution is limited and not sufficiently aligned with the imperatives of meaningful sustainable development as understood in my conceptual framework. As discussed in the previous chapter, the extent of local job creation stemming from the investment in renewable energy plants is overstated, with very few local people benefitting from employment opportunities on a full time and permanent basis. As has also been shown by a recent study by Malope (2022) of renewable energy and 'decent work' in another Karoo town called Loeriesfontein, the majority of the employment opportunities present themselves during the construction phase of the wind or solar farm. However, these jobs are short-term, generally low or semi-skilled and only provide a temporary boost to household income. Once the construction phase is over, only a handful of semi-skilled opportunities remain for local people, with the few skilled positions that are available filled by outsiders, including foreigners, who have the necessary expertise.

An important conclusion of this study is that the REIPPPP programme has not been designed with local development needs and local conditions in mind. The programme is the product of a contested national process and has been designed to meet national developmental objectives and address international commitments which are not automatically aligned with local needs. Local municipalities are not allowed to purchase electricity from the solar farm or windfarm in their backyard. They are required, rather, to purchase it from a national government parastatal, Eskom, that is struggling to manage its national infrastructure and service its ballooning debt. At the same time, local municipalities like the Emthanjeni Local Municipality are themselves in financial difficulties as a result of a combination of factors (including poor revenue collection and management and wasteful expenditure) and in arrears to Eskom. However, this is a one-sided relationship in which Eskom, the national utility, can determine when and for how long it

disconnects the municipality due to non-payment, with local consumers having to bear the brunt of the consequences.

This study has revealed the need for local energy provision. Yet while IPPs must commit to ED and SED projects in communities within a 50-kilometre radius of their plants, these commitments do not extend to direct energy provision. It can be argued that they are not mandated to do so, even though their entire investment is in the generation of electricity, but this is a reflection on the limited design of the REIPPP programme in terms of the way local development needs have been conceptualised. While I am not arguing that IPPs should act as a second state, they are mandated to invest in local towns and this mandate could be extended to encompass broader community needs. As already argued in Chapter Eight, redesigning the programme to enable renewable energy companies to distribute directly to local municipalities and/or households could make a significant contribution to local development, although this would require major policy shifts. Access to clean, affordable renewable energy would not solve all the challenges facing poor households, but it would go some way to alleviating many of the energy challenges they face and aid them in satisfying some basic needs.

That said, the REIPPPP does have the potential to make a more meaningful contribution if the existing SED and ED programmes it oversees were also reviewed and reconfigured. What was concerning through my fieldwork was to realise that both the national IPP office and the IPPs operating around De Aar did not welcome research on their ED and SED commitments and were not transparent in their reporting. As described in Chapter Two, while the IPP office appeared to be willing to share information with me initially, nothing came of this and what I experienced instead was a frustrating run-around between the office and IPP managers. This attitude hampers research which could potentially help improve the REIPPPP programme.

Access to information is not only vital for researchers but for local communities as well. Malope (2022) has argued that greater transparency is not simply a nice-to-have but should be a requirement as this will aid relationship building between IPPs and local communities. IPPs and the IPPO are not providing sufficient information to local communities regarding the projects and programmes that they are funding, thereby disregarding basic principles around community buy-in and local participation in community development. This is crucial as local people can only benefit from SED and ED initiatives if they are aware of them. Advertising initiatives on platforms such as

Facebook and company websites is not an effective way of communicating with potential beneficiaries who do not have the means to engage actively with these websites. Through an open access to their various programmes, locals can hold the IPP's accountable regarding their ED and SED deliverables. It is here where I argue that meaningful consultation is required in order for the process of SED and ED investment to be as transparent as possible.

Another issue to emerge through my case study is the extent to which local municipalities are dependent on electricity sales to local consumers, both domestic and commercial, as a general source of revenue for meeting general service delivery commitments and manage their local infrastructure. Local municipalities across the country are mandated by national government to provide electricity to residents within their boundaries. This includes distributing the electricity they purchase from Eskom, maintaining their electricity infrastructure and managing the indigency policy for free basic electricity. Almost half the households in the Emthanjeni Local Municipality are recipients of the indigent policy which imposes an additional financial burden on an already struggling municipality. However, municipalities are ill-equipped to handle these responsibilities. With regards to energy infrastructure, as described in Chapter Five, the Emthanjeni Local Municipality does not have the necessary expertise nor the funds to maintain and manage upgrades to its infrastructure, run security services to curb vandalism and theft and employ metre checkers to report on illegal and bridged metre connections. Strengthening both technical and financial management is clearly important, an issue which extends far beyond the REIPPPP.

South Africa has committed to transitioning to a low-carbon economy and confirmed its support for renewable energy as a critical component of that transition through signing various international undertakings such as the Kyoto Protocol and Paris Agreement in 2015. However, a host of political and economic obstacles described in Chapter Four have combined to constrain and delay the transition. These obstacles can be seen to be rooted in the historic role that the MEC has played in shaping the country's developmental path into the post-apartheid era. To date, the debate on the country's 'just transition' to a more sustainable energy dispensation has focused on the needs of the coal-mining areas of the country and not paid sufficient attention to issues in the areas in which renewable energy plants are being rolled out. Household energy poverty in these areas is one of the issues that needs to be addressed.

## 9.2 Recommendations for policy and further research

Several overlapping policy and research recommendations emerge from the previous discussion. One is for a review of the Free Basic Electricity policy in terms of the amount allocated and how it is implemented and funded. While the households of this study are connected to the electricity grid, it is clear that the FBE is not sufficient to meet their energy needs. The review must look at household size as a contributing factor.

More in-depth qualitative research is also required to explore the energy challenges of households and look at solutions that go beyond the current indigency policy. Exploratory qualitative research will aid in unpacking these challenges and contribute to deepening the understanding of the energy needs of low-income households. By way of example, I conducted my survey during spring while my follow-up in-depth interviews took place during summer and early autumn months. Doing a similar study in the winter months is likely to provide a more in-depth understanding on how energy needs fluctuate according to the seasons.

While I am confident that my findings are robust and could be extended to other low-income Karoo communities with similar histories and social characteristics such as Kareeville, I have been mindful not to generalise or compare my findings too readily across Karoo sites. Mine was an exploratory case study aimed at developing an in-depth understanding dynamic in the context of this former 'coloured' group areas township in the renewable energy hub of De Aar. A further recommendation for research, therefore, is for more comparative studies involving other towns in the Karoo and other parts of South Africa that have IPPs in their backyard.

The REIPPP programme, while lauded for its design and contribution to reducing South Africa carbon emissions, is still a relatively new programme that needs to be reviewed so that adjustments can be made in order to incorporate the results of new research and developments in the renewable energy sector. My study has focused on its potential to provide benefits at the local level. Here what needs to be considered is the potential for the programme to play a more proactive role in actual energy provision to local municipalities and households. One way of breaking with the MEC pathway is to look at

introducing more flexible and off-grid renewable energy, such as the solar home system options for low-income households and communities.

With regards to community trusts, SED, and ED programmes, the REIPPPP needs to be revised to ensure that meaningful consultation with residents is included in all initiatives aimed at local development so that they can ensure their development needs are recognised. Currently the SED and ED programmes view residents as beneficiaries who remain on the receiving end, not as active stakeholders who must be involved in projects intended to address their needs and advance social justice. Furthermore, they must review the institution of community trusts so that they are accountable to local people in how they manage and distribute the substantial funds that are accruing to them. How to do this is another important area for policy research.

Finding ways to ensure greatly improved communication and coordination between local municipalities and the IPPs operating in their areas also requires research and policy attention. Under the current REIPPPP framework, IPPs are able to function within silos and separate themselves from the local municipality. They are not required to collaborate or communicate with the local municipality which creates issues around trust. IPPs operating in the same municipality tend to view themselves as competitors which impedes their ability to work together on development projects. The responsibilities and needs of local municipalities must not be ignored as a strained relationship between these actors can be expected to be disruptive and counterproductive. While the IPPs cannot be expected to fulfil the role of the state, their SED and ED programmes do venture into areas where different spheres of government have responsibilities and provide services. While local municipalities are challenged with regards to capacity, they do have responsibility for local economic development, with their IDPs an important mechanism for identifying and prioritising needs.

In conclusion, the contribution of this dissertation lies in the way in which it deepens our understanding of, firstly, the importance of addressing household energy poverty as a critical dimension of the just transition away from coal-fired electricity, and, secondly, the challenges around achieving this, because of the way in which the investment in renewable energy in terms of South Africa's REIPPPP is currently structured. A multi-scalar assessment of energy poverty in De Aar draws attention to important issues that must be addressed in policy development as South Africa moves towards a new energy dispensation. These are 1), the moral imperative of ensuring that the renewable energy

being generated around Karoo towns makes a meaningful contribution to meeting the pressing energy needs of local residents; 2) the lack of local accountability around the ED responsibilities of IPPs, as well as the lack of coordination among them with regard to these commitments; 3) serious weaknesses in local government's ability to manage its responsibilities for electricity supply in small country towns.

Renewable energy is rightly seen as a critical development in the fight against climate change and reducing carbon emissions, the impacts of which are not only national and global policy concerns but also of direct concern to local households and communities. However, if local households cannot access sufficient electricity to meet their needs, do not have the capabilities they need to lift themselves out of poverty, do not understand the nature of or need for renewable energy, because they have not had the opportunity to learn about it, and are not consulted in meaningful ways about the investments in renewable energy taking place in their backyards, they are unlikely to perceive these investments as contributing to their wellbeing and therefore something to support. What this study is showing is that the current REIPPPP does not meet the criteria of sustainable development understood holistically. Ensuring that satisfying human needs and advancing social justice at the local level are addressed must be basic principles in designing a renewable energy programme that turns South Africa away from the unjust and unsustainable development path bequeathed by the MEC and makes the country's renewable energy resources work for all.

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Appendix 1: Longyuan Mulilo De Aar wind energy facility signage, May 2021



Photographed by Stephanie Borchardt, May 2021.

## Appendix 2: Research Ethical Clearance (2020-2021)



### NOTICE OF APPROVAL

REC: SBER - Annual Progress/ Final Report

15 September 2020

Project number: 0298

Project Title: What's Watt in De Aar? An exploration of local energy needs and challenges in a renewable-energy hub in the Karoo region of South Africa.

Dear Miss Stephanie Borchardt

Your REC: SBER - Annual Progress/ Final Report submitted on 12 August 2020 was reviewed and approved by the REC: Social, Behavioural and Education Research (REC: SBE).

Please note below expiration date of this approved submission:

#### Ethics approval period:

Protocol approval date (Humanities)	Protocol expiration date (Humanities)
24 August 2020	23 August 2021

#### SUSPENSION OF PHYSICAL CONTACT RESEARCH DURING THE COVID-19 PANDEMIC

Due to the Covid-19 pandemic and resulting lockdown measures, all research activities requiring physical contact or being in undue physical proximity to human participants has been suspended by Stellenbosch University. Please refer to a [formal statement](#) issued by the REC: SBE on 20 March for more information on this.

This suspension will remain in force until such time as the social distancing requirements are relaxed by the national authorities to such an extent that in-person data collection from participants will be allowed. This will be confirmed by a new statement from the REC: SBE on the university's dedicated [Covid-19 webpage](#).

Until such time online or virtual data collection activities, individual or group interviews conducted via online meeting or web conferencing tools, such as Skype or Microsoft Teams are strongly encouraged in all SU research environments.

If you are required to amend your research methods due to this suspension, please submit an amendment to the REC: SBE as soon as possible. The instructions on how to submit an amendment to the REC can be found on this webpage: [\[instructions\]](#), or you can contact the REC Helpdesk for instructions on how to submit an amendment: [applyethics@sun.ac.za](mailto:applyethics@sun.ac.za).

#### GENERAL REC COMMENTS PERTAINING TO THIS PROJECT:

##### INVESTIGATOR RESPONSIBILITIES

Please take note of the General Investigator Responsibilities attached to this letter. You may commence with your research after complying fully with these guidelines.

**If the researcher deviates in any way from the proposal approved by the REC: SBE, the researcher must notify the REC of these changes.**

Please use your SU project number (0298) on any documents or correspondence with the REC concerning your project.

Please note that the REC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

##### CONTINUATION OF PROJECTS AFTER REC APPROVAL PERIOD

You are required to submit a progress report to the REC: SBE before the approval period has expired if a continuation of ethics approval is required. The Committee will then consider the continuation of the project for a further year (if necessary).

Once you have completed your research, you are required to submit a final report to the REC: SBE for review.

#### Included Documents:

## Appendix 3: Household Survey (2017)

Energy consumption and household survey in Kareeville, De Aar October 2017 //  
Energieverbruik en huishoudlikeopname in Kareeville, De Aar Oktober 2017

Navorsers:	Stephanie Borchardt
Dorp:	De Aar
Datum:	
Adres:	

**Besonderhede van BESOEK(e):****Oorspronklike adres:****EERSTE BESOEK**

Datum

d	d	m	m	y	y

Time

Response

**TWEEDE BESOEK**

Datum

d	d	m	m	y	y

Time

Response

**DERDE BESOEK**

Datum

d	d	m	m	y	y

Time

Response

**Seleksie van respondent**

Wie in die huis weet die meeste van ander in die huishouding en sal vrae oor hulle kan beantwoord?

**Kodes vir besoeke:****Response:**

1. Vraelys voltooi
2. Respondent nie tuis, maar afspraak gemaak
3. Respondent(e) tuis, maar nie beskikbaar nie en moes 'n afspraak maak
4. Respondent weier onderhoud en is vervang
5. Niemand tuis, moet weer gaan ...

Ander, spesifiseer:

**Beantwoord asseblief die volgende:**



<p><b>In what language(s) was the interview conducted?</b> (circle all that apply)</p>	<p>1. Afrikaans 2. Engels</p> <p>Other, specify.....</p>
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**AFDELING A: General household characteristics // Algemene huishouding eienskappe**

<b>Q1</b>	<p><b>Watter taal praat julle die meeste in julle huis?</b></p> <p>1. Afrikaans 2. Engels 3. isiXhosa 4. Ander, spesifiseer .....</p>
<b>Q2</b>	<p><b>In watter tipe huis woon die huishouding (hoofsaaklik)?</b></p> <p>1. Baksteen huis (formeel opgerig) 2. Gedeeltelik baksteen (formeel opgerigte) huis 3. Informele woning/ "shack" in agterplaas (ingesluit 'n "wendyuis" in agterplaas) 4. Buitegebou/ "servant's quarters" 5. Ander, spesifiseer</p>
<b>Q3</b>	<p><b>Vertel my asb oor die eienaarskap van julle huis?</b></p> <p>1. Erf en woning besit deur iemand in huishouding – ten volle betaal 2. Erf en woning besit deur iemand in huishouding – gedeeltelik betaal 3. Slegs woning besit deur iemand in huishouding (nie erf nie) – ten volle betaal 4. Slegs woning besit deur iemand in huishouding (nie erf nie) – gedeeltelik betaal 5. Staat/munisipaliteit - gehuur 6. Nie-huishouding persoon besit dit - gehuur 7. 'n Werks-/maatskappyvoordeel, bly verniet, maar behoort nie aan huishouding nie 8. bly verniet, maar behoort nie aan huishouding nie (ander) 9. Ander, spesifiseer.....</p>
<b>Q4</b>	<p><b>Watter toiletgeriewe het julle?</b></p> <p>1. Geen 2. Puttoilet op erf 3. Spoeltoilet in huis 4. Spoeltoilet op erf, maar buite huis 5. Ander, spesifiseer</p>
<b>Q4.1</b>	<p>Indien puttoilet, gebruik julle dit of eerder die veld?</p> <p>1. Ja, gebruik 2. Nee, eerder die veld 3. Nee, gebruik iets anders</p>
<b>Q5</b>	<p><b>Het julle elektrisiteit in die woning?</b></p> <p>1. Ja, direk van Eskom – koopkrag 2. Ja, direk van Eskom - rekening 3. Ja, gekoppel aan hoofhuis/bure en betaal hulle daarvoor/ maak beurte om te betaal 4. Ja, gekoppel aan 'n ander bron en betaal nie vir die krag nie. 5. Ander elektrisiteit, spesifiseer (bv batterye, windkrag, generator) _____ 6. Nee</p>

<b>Q5.1</b>	<b>Indien wel, wat was die gemiddelde maandelikse koste van u elektrisiteit oor die afgelope 12 maande?</b>
	1. R0
	2. R1- R250
	3. R251 – R500
	4. R501 – R750
	5. R751 – R1000
	6. R1001 – R1250
	7. R1251+
	-9. <i>Weet nie</i>

**Die twee mees belangrike bronne van energie in huishouding? (As slegs 1 voltooi slegs belangrikste)**

<b>Q6</b>		Belangrikste/ enigste bron		Tweede belangrikste bron
Kook	<b>1.1</b>		<b>1.2</b>	
Beligting	<b>2.1</b>		<b>2.2</b>	
Waterverwarming	<b>3.1</b>		<b>3.2</b>	
Huisverwarming	<b>4.1</b>		<b>4.2</b>	
Ontspanningsgeriewe (Televiesestelsel of Radio/ klanksisteem)	<b>5.1</b>		<b>5.2</b>	
<b>Voeg kode van bronne in die blokkies hierbo</b>				
1. Elektrisiteit van munisipaliteit/Eskom		6. Mis /landbou-afval soos mieliestronke		
2. Elektrisiteit ander (generator, battery)		7. Paraffien		
3. Sonverwarmer		8. Steenkool/houtskool		
4. Hout gekoop		9. Gas		
5. Hout versamel, nie koop		10. Kerse		
		11. Geen		
		12. Ander, spesifiseer		

<b>Q7</b>	<b>Waar kry jy gewoonlik drinkwater vir die huishouding?</b>
	1. Kraan in woning
	2. Kraan buite, maar op die erf van die woning
	3. Kraan nie op die erf van die woning /gemeenskaplike kraan/bure se kraan
	4. Tenk op erf
	5. Boorgat op erf (windpomp/ander pomp)
	6. Ander,spesifiseer:.....

<b>Q8</b>	<b>Watter van die volgende items het die huishouding in 'n werkende toestand (gekonnekteer)?</b>							
	<b>a</b>	Elektriese stoof	1. Ja	2. Nee	<b>i</b>	Kar	1. Ja	2. Nee
	<b>b</b>	Radio/hi-fi	1. Ja	2. Nee	<b>j</b>	Motorfiets	1. Ja	2. Nee
	<b>c</b>	Televiesestel	1. Ja	2. Nee	<b>k</b>	Donkie-/perdekar	1. Ja	2. Nee
	<b>d</b>	Televiesekottel	1. Ja	2. Nee	<b>l</b>	Selfoon	1. Ja	2. Nee
	<b>e</b>	Yskas	1. Ja	2. Nee	<b>m</b>	Rekenaar/tablet	1. Ja	2. Nee
	<b>f</b>	Mikrogolf	1. Ja	2. Nee	<b>n</b>	Elektriese geysers	1. Ja	2. Nee
	<b>g</b>	Sonverwarmer/ geyser	1. Ja	2. Nee	<b>o</b>	huisligte	1. Ja	2, Nee
	<b>h</b>	Fiets	1. Ja	2. Nee				

<b>Q9</b>	<b>Het lede in die huishouding toegang tot die internet (soos bv op selfoon, skool, werk)?</b>
	1. Ja (INDIEN JA vra volgende vraag)

	2. Nee
<b>Q9.1</b>	<b>Indien wel, watter van die volgende bronne gebruik julle?</b>
	a. 'n Slimfoon 1. Ja 2. Nee 3. Weet nie
	b. By skool 1. Ja 2. Nee 3. Weet nie
	c. By biblioteek 1. Ja 2. Nee 3. Weet nie
	d. By Gemeenskapsentrum 1. Ja 2. Nee 3. Weet nie
	e. By die werk 1. Ja 2. Nee 3. Weet nie
	f. Wifi/Ander konneksie by die huis 1. Ja 2. Nee 3. Weet nie
	g. Ander, spesifiseer: .....

**AFDELING B: Energy consumption and access to electricity// Energieverbruik en toegang tot elektrisiteit**

<b>Q10</b>	<b>Do you receive Free Basic Electricity? / Kry u Gratis Basiese Elektrisiteit?</b> 1. Ja 2. Nee -9. Weet nie
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<b>Q11</b>	<b>If Yes, how did you find out about Free Basic Electricity? / Indien wel, hoe het jy uitgevind van Gratis Basiese elektrisiteit?</b>	<b>Ja</b>	<b>Nee</b>
.1	Municipality / Munisipaliteit	<b>1</b>	<b>2</b>
.2	Local Media/ Plaaslike mediabronne	<b>1</b>	<b>2</b>
.3	Friends or Family / vriende of familie	<b>1</b>	<b>2</b>
.4	Other (Specify)/ Ander	<b>1</b>	<b>2</b>
.5	Weet nie	<b>1</b>	<b>2</b>

<b>Q12</b>	<b>Which of the following sources of energy do you make use of in your home? Watter van die volgende energiebronne gebruik jy in die huis?</b>	<b>Ja</b>	<b>Nee</b>
.1	Paraffin/ Paraffien	<b>1</b>	<b>2</b>
.2	Gas	<b>1</b>	<b>2</b>
.3	Candle / Kerse	<b>1</b>	<b>2</b>
.4	Coal / Steenkool	<b>1</b>	<b>2</b>
.5	Firewood/ vuurhout	<b>1</b>	<b>2</b>
.6	Solar water geyser / Sonkraggeiser	<b>1</b>	<b>2</b>
.7	Car Batteries / karbatterye	<b>1</b>	<b>2</b>
.8	Generator (petrol/diesel)/ Kragopwekker (Petrol/Diesel)	<b>1</b>	<b>2</b>
.9	other (specify)/ Ander	<b>1</b>	<b>2</b>

<b>Q13</b>	<b>How much of the following energy sources does this household consume within a month? If possible, state cost in RAND/ Hoe baie van die volgende energiebronne gebruik hierdie huishouding binne 'n maand?</b>	<b>Consumption (Energy Cost) / Hoeveelheid gebruik (Koste van energie) (RAND) -9 = Weet Nie</b>	
	1. Paraffin / Paraffien		
	2. Gas		
	3. Candle / Kerse		
	4. Coal / Steenkool		
	5. Firewood /Vuurhout		
	6. Solar water geyser / Sonkraggeiser		
	7. Car Batteries / Karbattery		
	8. Generator (petrol/diesel)/ Kragopwekker (Petrol/ Diesel)		
9. Other (specify) / Ander			

<b>Q14</b>	<b>Do you ever go and look for sources of energy in De Aar? (for example, firewood, animaldung)/ Soek jy ooit vir enige energiebronne in die De Aar?</b>	<b>Ja</b>	<b>Nee</b>
		<b>1</b>	<b>2</b>
<b>Q14.1</b>	<b>If yes, please elaborate where you collect the sources/ Indien wel, brei asseblief uit waar u die bronne kry.</b>		

<b>Q15</b>	<b>Do you ever make your own sources of energy (for example, charcoal or candles)/ Maak jy ooit jou eie bronne van energie?</b>	<b>Ja</b>	<b>Nee</b>
		<b>1</b>	<b>2</b>
<b>Q15.1</b>	<b>If yes, please elaborate/ Indien wel, brei asseblief uit.</b>		

<b>Q16</b>	<b>We have enough electricity every month for / Ons het genoeg elektrisiteit elke maand vir:</b>	<b>Ja</b>	<b>Nee</b>
.1	Cooking/ Kook	<b>1</b>	<b>2</b>
.2	Lighting/ Beligting	<b>1</b>	<b>2</b>
.3	Heating of space/ Huisverwarming	<b>1</b>	<b>2</b>
.4	Heating of water/ Waterverwarming	<b>1</b>	<b>2</b>
.5	Recreational (eg. TV, sound system)/ Ontspanningsgeriewe	<b>1</b>	<b>2</b>

<b>Q17</b>	<b>If the amount of electricity is inadequate, what are the main reasons? / As die hoeveelheid elektrisiteit nie genoeg is nie, wat is die hoof rede dat daar 'n tekort is?</b>	<b>Ja</b>	<b>Nee</b>
.1	Not enough money to pay for electricity / <i>Nie genoeg geld om te betaal vir elektrisiteit nie</i>	<b>1</b>	<b>2</b>
.2	Electrical power outages / <i>kragonderbrekings</i>	<b>1</b>	<b>2</b>
3.	Landlord/ neighbours switch electricity supply off/ <i>Die verhuurder/bure sny die elektrisiteitstoeloo af</i>	<b>1</b>	<b>2</b>
4.	A bad electrical connection/ <i>'n swak elektrisiteiskonneksie</i>	<b>1</b>	<b>2</b>
5.	Other, please specify	<b>1</b>	<b>2</b>

<b>Q18</b>	<b>Is your electricity supply ever interrupted? / Is julle elektrisiteitstoervoer ooit onderbreek</b> 1. Ja 2. Nee - 9. <i>Weet nie</i>
<b>Q18.1</b>	<b>If yes, please explain what caused the interruption / Indien wel, verduidelik asseblief wat die onderbreking veroorsaak het</b>

**AFDELING C: Development in town // Ontwikkeling in die dorp**

<b>Q19</b>	<p><b>What are the major development needs in the community? / Wat is die belangrikste ontwikkelingsbehoefte in die gemeenskap?</b> -9. Weet nie</p>
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<b>Q20</b>	<p><b>What do you expect your community's economic situation to be like in 5 years' time? As jy na jou ekonomiese situasie nou kyk, hoe dink jy gaan jou gemeenskap se ekonomiese situasie wees in 5 jaar?</b></p>	<b>Better</b>	<b>The same</b>	<b>Worse</b>	<b>N/A, DK</b>
		<b>1</b>	<b>2</b>	<b>3</b>	<b>-9</b>
<b>Q20.1</b>	<p><b>Please provide reasons for your answer/ Veduidelik asseblief u antwoord:</b></p>				

**AFDELING D: Perceptions of renewable energy // Persepsies van hernubare-energie**

Q21	Have you heard of the term 'renewable energy'? / <i>Het jy al gehoor van die term 'hernubare-energie'?</i>	Ja	Nee
		1	2
Q21.1	If yes, what does the term mean? / <i>Indien wel, wat verstaan jy daaronder?</i>		

Q22	Have you heard/found out about the wind and solar farms in De Aar? <u>If not heard about it skip to Section E</u> <i>Hoe jy al van die wind – en sonplase in De Aar uitgehoor?</i>	Ja	Nee
.1	Community Radio programmes / <i>Gemeenskapsradio-programme</i>	1	2
.2	Public meetings / <i>Openbare vergaderings</i>	1	2
.3	Newspaper articles / <i>Koerantartikels</i>	1	2
.4	Educational leaflets/pamphlets / <i>Opvoedkundige pamflette</i>	1	2
.5	Word of mouth / <i>Ander mense</i>	1	2
.6	Have not heard about it / <i>Het nog nie daarvan gehoor nie</i>	1	2
.7	Local stakeholder's forum / <i>Plaaslike belangegroep forum</i>	1	2
.8	Other (specify)	1	2

Q23	Do you know how many wind and solar farms there are in De Aar? / <i>Weet jy dalk hoeveel son – en windplase daar in De Aar is?</i>
	-9 Weet nie

Q24	Do you know the names of the wind and solar farm companies in De Aar? If yes, please list them / <i>Ken jy die naam van enige van die wind- en sonplaasmaatskappye in De Aar? Kan jy dit noem?</i>
	-9 Weet nie

Q25	According to you, what is the contribution of the renewable energy companies to the town? / <i>Volgens u mening, watter bydra lewer die hernubare-energiemaatskappye vir die dorp?</i>
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Q26	<b>Do you know of any community projects run by renewable energy companies in De Aar?</b> <i>/ Weet u van enige gemeenskapsprojekte wat deur hernubare energie maatskappye in De Aar bedryf word?</i>	1	Ja
		2	Nee
		-9	Weet nie
If yes, please elaborate / indien moontlik, brei asseblief uit:			

Q27	<b>Do you think that YOUR household has benefitted from the renewable energy facilities so far?</b> <i>Dink jy dat jou huishouding tot dusver voordeel getrek het uit die hernubare-energiefasiliteite?</i>	1	Ja
		2	Nee
		-9	Weet nie
Q27.1	Please provide reasons for your answer/ Veduidelik asseblief u antwoord:		

Q28	<b>Do you think that YOUR town has benefitted from the renewable energy facilities so far?</b> <i>Dink jy dat jou dorp tot dusver voordeel getrek het uit die hernubare-energiefasiliteite?</i>	1	Ja
		2	Nee
		-9	Weet nie
Q28.1	Please provide reasons for your answer/ Veduidelik asseblief u antwoord:		

Q29	What impact, if any, do you think renewable energy facilities have had on the people living in your town/area? <i>Watter impak, indien enige, dink jy het hernubare-energiefasiliteite op die mense van De Aar gehad? Het dit:</i>	Ja	Onseker	Nee	Weet nie
a.	Create more jobs / <i>werksgeleenthede geskep</i>	1	2	3	4
b.	Stimulate interest in science & engineering/ <i>Stimuleer belangstelling in wetenskap en ingenieurswese</i>	1	2	3	4
c.	Promote pride in your area / <i>Bevorder trots in jou area</i>	1	2	3	4
d.	Increase businesses opportunities / <i>Verhoog besigheidsgeleenthede</i>	1	2	3	4
e.	Improve services (e.g. hospitals, community centres; schools) / <i>Verbeter dienste</i>	1	2	3	4
f.	Increase community conflict / <i>Verhoog gemeenskapskonflik</i>	1	2	3	4
g.	Infrastructure upgrades (e.g. better roads) / <i>Opgradering van infrastruktuur</i>	1	2	3	4
h.	Prevents developments (e.g. takes up land and space - less land for farming) / <i>Beperk ontwikkeling (bv. neem grond weg van boerdery)</i>	1	2	3	4

i.	Attract skills into the area / <i>Aantrekking van vaardighede na die dorp</i>	1	2	3	4
j.	Become a centre of renewable energy/ <i>Maak dit 'n sentrum vir hernubare-energie).</i>	1	2	3	4

Q30	<b>Any other comments you would like to make about the renewable energy facilities?</b> <i>Enige ander opmerkings wat jy oor die hernubare-energiefasiliteite wil maak?</i>
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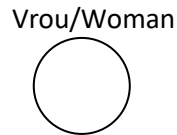
**AFDELING E: Huishouding // Household**

Die vrae in hierdie afdeling is van toepassing op alle lede van die huishouding.

- **Respondent** is die persoon wie die meeste weet van die huis se inkomste/ detail ken van lede van die huishouding.
- Dui die **Respondent** met 'n **R** op die genogram aan.
- Elke persoon in die huishouding kry 'n **nommer** op die genogram.
- Die **respondent is nommer 1** (persoonkode/code).

**Wie is almal lede van die huishouding?:**

1. Almal wat gereeld hier bly en wie van die huishouding gedeeltelik afhanklik is/ bydraes maak tot die huishouding (in terme van finansieel).
2. Afhanklike kinders elders op skool en studente wie huis toe kom oor naweke vakansies.
3. Mense wat elders werk en die huishouding help onderhou, bv. 'n Lid wat elders werk maar wat dié huishouding as sy/haar permanente huishouding beskou.
4. Mense wat elders werk soek en steeds afhanklik van die huishouding is.
- 5.

**GENOGRAM:**

## General particulars of household members // Algemene eienskappe van lede van die huishouding:

	E1	E2	E3	E4	E5
<b>Code</b> <i>R is</i> <b>1</b>	<b>Almal Geslag</b> 1. Man 2. Vrou 3. Ander /Inter-geslag	<b>Almal Hoe oud is persoon X?</b> <i>Ouderdom met laaste verjaarsdag / vir baba jonger as 1jr dui 0 aan</i>	<b>Almal Wat is x van jou (respondent) (verwantskap)?</b> 1. Respondent 2. Man/vrou/'partner' 3. Kind 4. Broer/ suster 5. Vader/ moeder 6. Grootouer 7. Kleinkind 8. Ander familielid 9. Pleegkind 10. Ander nie-verwante persoon	<b>Almal Ras volgens SA bevolkingsgroepe</b> 1. Bruin/ kleurling 2. Indiër/Asiër 3. Swart 4. Wit <u>5. Ander, spesifiseer</u>	<b>Almal 7 of ouer Hoogste graad of standerd voltooi? Sluit slegs kursusse van 6 mnde of langer in</b> 1. Geen formele opleiding, kan wel lees & skryf 2. Geen formele opleiding, <u>kan nie</u> lees of skryf nie 3. Gr. 1/Sub A 4. Gr. 2/Sub B 5. Gr. 3/Std. 1 6. Gr. 4/Std. 2 7. Gr. 5/Std. 3 8. Gr. 6/Std. 4 9. Gr. 7/Std. 5 10. Gr. 8/Std. 6 11. Gr. 9/Std. 7 12. Gr. 10/Std. 8 13. Gr 11/Std. 9 14. Gr. 12/Std.10 15. Diploma without 16. Diploma with ma 17. Some university 18. University degree 19. Don't know 20. Refused to answer  <u>21. Other, specify</u>
<b>1</b>					
<b>2</b>					
<b>3</b>					
<b>4</b>					
<b>5</b>					
<b>6</b>					
<b>7</b>					
<b>8</b>					
<b>9</b>					
<b>10</b>					
<b>11</b>					
<b>12</b>					
<b>13</b>					
<b>14</b>					
<b>15</b>					

	E6	E7	E8	E9
Code <i>R is</i> 1	<p><b>In watter jaar het X in De Aar dorp begin bly?</b> 1. Sedert geboorte</p> <p><u>-9 = Weet nie</u></p>	<p><b>Ontvang persoon X 'n SASSA toelaag? Dui toelaag aan teenoor begunstigde, bv teenoor kind as kindertoelaag)</b></p> <ol style="list-style-type: none"> <li>1. Nee</li> <li>2. Oumens pay / oorlog-veterane (Old persons grant)</li> <li>3. Ongeskikt-heid (volwassene)</li> <li>4. Kinderonder-steuning (CSG)</li> <li>5. Pleegsorg (Foster child grant)</li> <li>6. Sorgafhanklikheidstoelaag ("ongeskikt-heid" vir kinders)</li> </ol> <p>(Los oppassers toelaag wat soms saam met ander toelae gegee word)</p>	<p><b><u>15 jaar + ouer</u></b> <b>Het X tans 'n werk of doen X tans iets om geld te verdien?</b> (ingesluit eie besigheid)</p> <ol style="list-style-type: none"> <li>1. Ja</li> <li>2. Nee (gaan na vraag E12)</li> </ol>	<p><b><u>15jr + wie werk</u></b> <b>Indien ja, is persoon x se (hoof)werk 'n:</b></p> <ol style="list-style-type: none"> <li>1. <b>Gereelde</b> betaalde werk vir een werkgewer</li> <li>2. <b>Gereelde</b> betaalde werk vir verskeie werkgewers gedurende dieselfde maand</li> <li>3. <b>Seisoenswerk</b></li> <li>4. <b>Tydlike</b> werk/los werkies/"odd jobs"</li> <li>5. <b>Eie besigheid/ werk vir haarself/ homself</b> (bv. Huiswinkel/ spaza)</li> <li>6. Ander, spesifiseer asb</li> </ol>
<b>1</b>				
<b>2</b>				
<b>3</b>				
<b>4</b>				
<b>5</b>				
<b>6</b>				
<b>7</b>				
<b>8</b>				
<b>9</b>				
<b>10</b>				
<b>11</b>				
<b>12</b>				
<b>13</b>				
<b>14</b>				
<b>15</b>				

	<b>E10</b>	<b>E12</b>	<b>E13</b>
<b>Code</b> <i>R is</i> 1	<b>15jr + wie werk</b> <b>Wat is X se (hoof)werk?</b> 1. Huiswerker 2. Plaaswerker 3. Draadspanner 4. Skeerder 5. Tuinwerker 6. Algemene werker 7. Onderwyser 8. Polisiebeampte 9. Boukontraakteur 10. Ambagsman (loodgieter, elektrisiën, mechanic ens) 11. Verpleegkundige 12. Dokter 13. Drywer 14. Admin werker 15. Algemene munisipale werker 16. Gemeenskaps-program (community works program) 17. Boer 18. Algemene bestuurder 19. Dominee/ Pastoor/ Priester 20. Graad R praktisyn 21. Ander, spesifiseer asb	<b>15 jaar of ouer, doen nie betaalde werk nie</b> <b>As X nie tans betaalde werk doen nie, hoekom nie?</b> 1. Kan <u>geen</u> werk kry nie 2. Kan nie <u>geskikte</u> werk kry nie (onvoldoende salaris, plek, toestande) 3. Het werk gekry, maar begin later 4. Pensioenaris / afgetree en verkies om nie betaalde te werk te doen nie 5. Fisies gestrem/benadeel/ siekte 6. Tuisteskepper en verkies om nie te werk nie 7. Skolier/student 8. Seisoenswerker (skeerder/vrugte ens), wag vir seisoen 9. Kontrakwerker rus tot vlg kontrak begin 10. Het ander inkomste en hoef nie te werk nie 11. Dink dat sy/hy te oud (ouer as 60)/ te jonk is 12. Het CV al uitgestuur, maar nog niks gehoor nie. 13. Ander	<b>Monthly income from all sources / Maandelikse inkomste van alle bronne</b> 1. R0 – R4500 2. R1 – R500 – R5000 3. R501 – R1000 – R5500 4. R1001 – R1500 – R6000 5. R1501 – R2000 – R6500 6. R2001 – R2500 – R7000 7. R2501 - R3000 – R7500 8. R3001 – R3500 – R8000 9. R3501 – R4000 R8001+ 10. R4001 11. R4501 12. R5001 13. R5501 14. R6001 15. R6501 16. R7001 17. R7501 18. 19. Refused/ <i>Weier</i> -9. Don't Know/ <i>Weet Nie</i>
<b>1</b>			
<b>2</b>			
<b>3</b>			
<b>4</b>			
<b>5</b>			
<b>6</b>			
<b>7</b>			
<b>8</b>			
<b>9</b>			
<b>10</b>			
<b>11</b>			
<b>12</b>			
<b>13</b>			
<b>14</b>			
<b>15</b>			

THANK YOU FOR YOUR KIND CO-OPERATION AND ASSISTANCE// DANKIE VIR JOU TYD EN DEELNAME

**Any additional comments about specific questions or data quality**

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**Any other comments**

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## Appendix 4: Informed consent to Kareeville residents to participate in the households Survey (2017)



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jou kennisvenoot • your knowledge partner

### STELLENBOSCH UNIVERSITY CONSENT TO PARTICIPATE IN RESEARCH

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Good day

My name is Stephanie Borchardt. I am a master's student in the Department of Sociology and Social Anthropology, Stellenbosch University, South Africa. I would like to invite you to participate in a research project entitled, "What's Watt in De Aar? An exploration of local energy needs and challenges in a renewable-energy hub in the Karoo region of South Africa". The aim of the study is to explore the energy usage and challenges in De Aar. The study will also look at the renewable energy companies in De Aar as well as address the concept of sustainable development. As part of this study, I wish to collect information from people like yourself who are working in and/or knowledgeable about household energy usage and the renewable energy companies.

Please take some time to read the information presented here, which will explain the details of this project and contact me if you require further explanation or clarification of any aspect of the study. Also, your participation is **entirely voluntary**, and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do agree to take part.

If you agree to take part in this study, I will ask you to respond to some questions and engage in a conversation with me, in which you draw on your experiences and knowledge concerning the issues related to my study. Our conversation should take approximately 45 minutes to one hour. Before I proceed, I need your agreement, orally that you are aware of the following.

1. There are no foreseeable risks to you in my research. There will also be no direct benefit to you, including no payment of money for agreeing to take part.
2. You will not be identified as a participant in the study.
3. All the data I collect will be stored securely and only be used for legitimate research purposes. The data gathered may be archived and analysed at a later stage as part of Professor Walker's SARChI research programme, *the sociology of land, environment and sustainable development*, of which I am a member.
4. I may publish the results of my study in an academic publication.



If you have any questions or concerns about the research, please feel free to contact me or my supervisor:

**Researcher:** Stephanie Borchardt, tel: 079 380 1945; e-mail: 18033849@sun.ac.za

**My supervisor:** Prof. Cheryl Walker, Department of Sociology & Social Anthropology, Stellenbosch University, Private Bag XI Matieland 7602, South Africa; (tel: 021 808 2420; e-mail: cjwalker@sun.ac.za).

**RIGHTS OF RESEARCH PARTICIPANTS:** You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research participant, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development.

You have right to receive a copy of the Information and Consent form.

## Appendix 5: Informed consent to participate in the households Survey (2017), Afrikaans version



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jou kennisvenoot • your knowledge partner

### STELLENBOSCH UNIVERSITEIT TOESETEMMING OM AAN NAVORSING DEEL TE NEEM

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Goeie dag

My naam is Stephanie Borchardt. Ek is 'n Meestersgraadstudent in die Departement van Sosiologie en Sosiale Antropologie by Stellenbosch Universiteit, Suid-Afrika. Ek wil u graag uitnooi om deel te neem aan 'n navorsingsprojek getiteld "Wat is Watt in De Aar? 'N Verkenning van plaaslike energiebehoefte en uitdagings in 'n hernubare-energie-hub in die Karoo-streek van Suid-Afrika". Die doel van die studie is om die energieverbruik en energieuitdagings in De Aar te ondersoek. Die studie sal ook kyk na die hernubareenergiemaatskappye in De Aar en ook die konsep van volhoubareontwikkeling aanspreek. As deel van hierdie studie wil ek inligting insamel van mense soos jouself wat werk in en / of kennis het van huishoudelikeenergieverbruik en die hernubareenergiemaatskappye.

Neem asseblief tyd om die inligting wat hier aangebied word, te lees, wat die besonderhede van hierdie projek sal verduidelik en my sal kontak indien u verdere besonderhede of verduidelikings van enige aspek van die studie verlang. Jou deelname is ook **heeltemal vrywillig** en jy is vry om te weier om deel te neem. As jy nee sê, sal dit jou nie negatief beïnvloed op enige manier hoegenaamd nie. U kan ook op enige stadium van die studie onttrek, selfs al stem u nie in om deel te neem nie.

As jy saamstem om aan hierdie studie deel te neem, sal ek jou vra om op sommige vrae te reageer en met my in gesprek te tree, waarin jy jou ervarings en kennis aangaande die kwessies wat met my studie verband hou, teken. Ons gesprek behoort ongeveer 45 minute tot `n uur te neem. Voordat ek voortgaan, het ek jou mondelingtoestemming nodig dat u van die volgende bewus is.

1. Daar is geen voorspelbare risiko's vir jou in my navorsing nie. Daar sal ook geen direkte voordeel vir u wees nie, insluitend geen betaling van geld vir die aanvaarding van deelname nie.

2. U sal nie as deelnemer aan die studie geïdentifiseer word nie.

3. Al die data wat ek versamel, sal veilig gestoor word en slegs vir navorsingsdoeleindes gebruik word. Die data wat ingesamel word, kan in 'n later stadium geargiveer en ontleed word as deel van Professor Walker se SARCHI-navorsingsprogram, *die sosiologie van grond, omgewing en volhoubareontwikkeling* waarvan ek lid is.

4. Ek mag die uitslae van my studie in 'n akademiese publikasie publiseer.

As u enige vrae of kommentaar oor die navorsing het, kontak gerus my of my studieleier:

**Navorsers:** Stephanie Borchardt, tel: 079 380 1945; e-pos: 18033849@sun.ac.za

**My studieleier:** Prof. Cheryl Walker, Departement Sosiologie en Sosiale Antropologie, Universiteit Stellenbosch, Privaatsbag XI Matieland 7602, Suid-Afrika; (tel: 021 808 2420, e-pos: cjwalker@sun.ac.za).

**REGTE VAN NAVORSINGSDELOTTE:** U mag u toestemming te eniger tyd terugtrek en deelname sonder straf verbied. U verwerp nie enige regs eise, regte of remedies as gevolg van u deelname aan hierdie navorsingsstudie nie. As u vrae het aangaande u regte as navorsingsdeelnemer, kontak me. Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] by die Afdeling Navorsingsontwikkeling. U het die reg om 'n afskrif van die Inligting- en Toestemmingsvorm te ontvang.

Appendix 6: Confidentiality Agreement for Transcription service provider (signed)



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jou kennisvenoot • your knowledge partner

**STELLENBOSCH UNIVERSITY**  
**Confidentiality Agreement for Transcription Services Provider**

**Transcription Services project:** Transcription of research interviews recorded by S P Borchardt during fieldwork for her MA (Sociology) thesis.

**Number and identification of interviews:** Interview file name- 0017, 0020, 0021, 0023, 0025, 0026, 0027, 0030, 0032, 0034, 0035 (Kareeville residents, April 2018). Interview file name- Ethembeni\_staff and FARR\_LianMarie (Non-governmental organisations, April 2018). Interview file name: SolarCapital\_Abner (Renewable energy company\_April 2018). Interview file name: Victor\_Part2\_20Oct (Emthanjeni Municipality LED officer\_ October 2017).

**Research Ethics Committee project number:** SOC-2017-0298-831

1. I, [REDACTED] transcriptionist, agree to maintain full confidentiality of all research data received from the researcher related to this research study.
2. I will hold in strictest confidence the identity of any individual that may be revealed during the transcription of interviews or in any associated documents.
3. I will not make copies of any audio-recordings, video-recordings, or other research data, unless specifically requested to do so by the researcher.
4. I will not provide the research data to any third parties without the client's consent.
5. I will store all study-related data in a safe, secure location as long as they are in my possession. All video and audio recordings will be stored in an encrypted format.
6. All data provided or created for purposes of this agreement, including any back-up records, will be returned to the researcher or permanently deleted. When I have received confirmation that the transcription work, I performed has been satisfactorily completed, any of the research data that remains with me will be returned to the researcher or destroyed, pursuant to the instructions of the researcher.
7. I am aware that I can be held legally liable for any breach of this confidentiality agreement, and for any harm incurred by individuals if I disclose identifiable information contained in the audiotapes and/or files to which I will have access.

[REDACTED]  
LH/18

**DECLARATION BY TRANSCRIPTION SERVICE PROVIDER**

Transcriber's name (printed) \_\_\_\_\_

Transcribers ID number: \_\_\_\_\_

Place: Backenfell

Transcriber's signature \_\_\_\_\_

Date 06 November 2018

## Appendix 7: Interviewer schedule with Kareeville residents

Date:

Identification:

The interview will cover the following topics:

### **Basic Background information:**

- Age
- Gender
- Race
- Education
- Home Language
- Occupation
- Residence
- Household size
- Source of household income

### **Energy usage and needs:**

Topics to be covered include:

- Usages of different energy products
- Household consumption patterns
- The household energy needs.
- Electricity supply
- Energy supply challenges

### **Knowledge of renewable energy facilities:**

Topics to be covered include:

- Awareness of renewable energy facilities in De Aar
- Expectation of the renewable energy companies/ renewable energy facilities
- Changes in the community due to renewable energy facilities
- Renewable energy's impact on the household
- Renewable energy's impact on the community
- 

### **Understanding of sustainable development:**

Topics to be covered include:

- Understanding of sustainable development
- Major development needs in the community

- Individual contribution to sustainable development
- Contribution of renewable energy to sustainable development

## Appendix 8: Interviewer schedule with non-governmental organisations in De Aar

Date:

Identification:

The interview will cover the following topics:

### **Basic Background information:**

- Age
- Gender
- Race
- Education
- Home Language
- Occupation
- Organisation
- Length of occupation with the organisation
- Residence

### **Involvement in De Aar:**

Topics to be covered include:

- A brief history of the organisation
- The organisation's view of the community (major challenges and resources)
- An overview of the organisation's facilities and programmes with the community
- 

### **Involvement with renewable energy companies:**

Topics to be covered include:

- Perceptions of the renewable energy companies
- The renewable energy companies' involvement with the NGO
- The impact of the renewable energy companies on the community
- The impact of renewable energy companies on the organisation



## Appendix 9: The Ethembeni Community & Trauma centre



Photographer by Stephanie Borchardt, September 2017

Appendix 10: The Joan Wertheim Centre (FARR)



Photographer by Stephanie Borchardt, September 2017

## Appendix 11: Interview schedule with local municipal officials

Date:

Identification:

The interview will cover the following topics:

### **Basic Background information:**

- Age
- Gender
- Race
- Education
- Home Language
- Occupation
- Length of occupation with organisation
- Organisation
- Residence

### **Electricity supply and the grid infrastructure of De Aar:**

Topics to be covered include:

- A brief overview of De Aar's grid infrastructure
- Electricity supply and needs.
- Household electrification
- Electricity challenges
- The local municipality's interaction with Eskom
- The local municipality's interaction with provincial government
- Usage of renewable energy technologies within the municipality

### **Communication with renewable energy companies:**

Topics to be covered include:

- Perceptions of the renewable energy companies
- The local municipality's interaction with the renewable energy companies
- The renewable energy facilities impact on the community
- The renewable energy facilities impact on the local municipality's energy infrastructure

**Understandings of sustainable development:**

Topics to be covered include:

- Understanding of sustainable development
- Local mandate towards sustainable development
- National understanding of sustainable development
- Contribution of renewable energy to sustainable development

## Appendix 12: Interview schedule with IPP employees

Date:

Identification:

The interview will cover the following topics:

### **Basic Background information:**

- Age
- Gender
- Race
- Education
- Home Language
- Occupation
- Length of occupation with the organisation
- Organisation
- Residence

### **Company History:**

Topics to be covered include:

- A brief history of the company
- An overview of the renewable energy facilities in De Aar
- Process of REIPPPP
- Communication with Eskom
- Communication with the local municipality

### **Involvement in De Aar:**

Topics to be covered include:

- The company's socio-economic responsibility
- The company's enterprise development responsibility
- The challenges of constructing and managing a renewable energy facility in De Aar
- The community's reaction to the company and to renewable energy.
- De Aar's electricity supply

### **Understanding of sustainable development:**

Topics to be covered include:

- Understanding of sustainable development
- Local understanding of sustainable development
- National understanding of sustainable development
- Contribution of renewable energy to sustainable development

Appendix 13: Mulilo AGM notice circulated via email.



**PUBLIC NOTICE**

**MULILO DE AAR SOLAR COMMUNITY TRUST  
MULILO DE AAR WIND COMMUNITY TRUST**

**THE INAUGURAL ANNUAL GENERAL MEETING OF THE  
MULILO DE AAR SOLAR COMMUNITY TRUST  
AND  
MULILO DE AAR WIND COMMUNITY TRUST**

**TO:** The Mulilo De Aar Solar Community Trust Beneficiaries  
The Mulilo De Aar Wind Community Trust Beneficiaries  
Residents of Emthanjeni Local Municipality (**De Aar and Britstown**)

All the beneficiaries of the Mulilo De Aar Solar and Wind Community Trusts are invited to the **1<sup>st</sup> Annual General Meeting (AGM)** of the Mulilo De Aar Solar Community Trust and Mulilo De Aar Wind Community Trust to be held as follows:

**Date:** Sunday, 10 December 2017  
**Venue:** De Aar – Town Hall  
**Time:** 14h00

Appendix 14: Photographs taken by farmer during the construction phase of the wind farm







Appendix 15: McGregor Museum consent for usage of photographic collection

McGregor Museum  
PO Box 316, Kimberley, 8300, South Africa  
Tel 27 (0)53 839 2700  
Fax 27 (0)53 842 1433  
e-mail: [photos@museumsnc.co.za](mailto:photos@museumsnc.co.za)

All enquiries concerning photographs to be addressed to: [enquiries@museumsnc.co.za](mailto:enquiries@museumsnc.co.za)

Photographic Collection  
Usage form

Permission is hereby granted to: Stephanie Borchardt

of: Stellenbosch university

to use a copy of the following images from the Museum collection:

mmkp13197  
mmkp3718  
mmkp3721  
mmkp3726  
mmkp5846  
mmkp7827-1  
mmkp7827-2  
MMKP7832-1\_001  
MMKP7832-2\_001  
mmkp7851\_001  
mmkp7852\_001  
mmkp7860-1  
mmkp7860-2  
mmkp10955-1  
mmkp10956  
mmkp13196

for the purpose of: a PhD dissertation in Sociology

The following conditions must be adhered to:

1. The copy images/film clips become the property of the above-mentioned client and may not be exchanged, sold, donated, lent or transferred to a third party.
2. The images/ film clips are to be used only for the above-stated purpose. If they are utilised in any other way prior permission from the Museum must be obtained.

## Appendix 16: Research ethical clearance (2022-2023)

**CONFIRMATION OF RESEARCH ETHICS APPROVAL**

REC: SBER - Annual Progress Report

28 January 2022

Project number: 0298

Project Title: What's Watt in De Aar? An exploration of local energy needs and challenges in a renewable-energy hub in the Karoo region of South Africa.

Dear Miss SP Borchardt

**Identified supervisor(s) and/or co-investigator(s):**

Prof CJ Walker

Your REC: SBER - Annual Progress Report submitted on 11/12/2021 18:57 was reviewed and approved by the Social, Behavioural and Education Research Ethics Committee (REC: SBE).

Your research ethics approval is valid for the following period:

Protocol approval date (Humanities)	Protocol expiration date (Humanities)
28 January 2022	27 January 2023

**GENERAL COMMENTS PERTAINING TO THIS PROJECT:****INVESTIGATOR RESPONSIBILITIES**

1. Please take note of the General Investigator Responsibilities attached to this letter. You may commence with your research after complying fully with these guidelines.
2. Your approval is based on the information you provided in your online research ethics application form. If you are required to make amendments to or deviate from the proposal approved by the REC, please contact the REC: SBE office for advice: [applyethics@sun.ac.za](mailto:applyethics@sun.ac.za)
3. Always use this project ID number (0298) in all communications with the REC: SBE concerning your project.
4. Please note that the REC has the prerogative and authority to ask further questions, seek additional information, and monitor the conduct of your research and the consent process, where required.

**RENEWAL OF RESEARCH BEYOND THE EXPIRATION DATE**

You are required to submit a progress report to the REC: SBE before the project approval period expires if renewal of ethics approval is required.

If you have completed your research, you are required to submit a final report to the REC: SBE to close the active REC record for this project.

**Project documents approved by the REC:**

Document Type	File Name	Date	Version
Informed Consent Form	Borchardt_English_Consent[2305843009215218879]	09/12/2021	1
Informed Consent Form	Borchardt_afrikaans consent form	09/12/2021	1
Default	BorchardtSP_Response to REC stipulations	11/12/2021	1
Default	Borchardt_SP_Adjustedtimeframe	11/12/2021	1
Research Protocol/Proposal	For_REC_Borchardt, PhD Proposal_OriginalwithRecAmendments	11/12/2021	1

If you have any questions or need further help, please contact the REC office at [applyethics@sun.ac.za](mailto:applyethics@sun.ac.za)

Sincerely,

## Appendix 17: Institutional permission letter

DATE

Dear [Title, friend, officer]

My name is Stephanie Borchardt. I am currently enrolled at Stellenbosch University in a master's programme in the Department of Sociology and Social Anthropology. My supervisor is Professor Cheryl Walker who can be contacted by email: [cjwalker@sun.ac.za](mailto:cjwalker@sun.ac.za) or telephone: 021 808 2420 should you have any queries you would like to direct to her.

The aim of my research is to explore the energy needs and challenges facing low-income households in the small town of De Aar, in the Northern Cape, in relation to the significant national and international investment in renewable energy that is currently taking place around the town, as part of South Africa's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). I am interested in what impact the renewable energy companies are making in De Aar as well as unpacking the concept of sustainable development.

As part of my research, I would like to include interviews with representatives of the renewable energy companies, the local municipality, and a local non-governmental organisation as they are working in and/or knowledgeable relating to De Aar's energy supply, renewable energy, household energy usage and social issues in the town. My project has been approved by the (Humanities) Research Ethics Committee of Stellenbosch University and all interviews will be conducted in accordance with the principles of informed consent. We are also encouraged to ensure that institutional permission is forthcoming in situations where we wish to interview individuals in public positions, which is why I am writing to you.

As part of my research, I would like to interview you or appropriate people in your institution at the earliest convenience. Please could you advise me whether this will be in order or how I should proceed to secure the necessary approval from your institution?

I look forward to hearing from you.

Kind Regards

Stephanie Borchardt (MA)

*DST/NRF SARChI Chair in The Sociology of Land, Environment and Sustainable Development*

*Department of Sociology and Social Anthropology*

*Stellenbosch University*

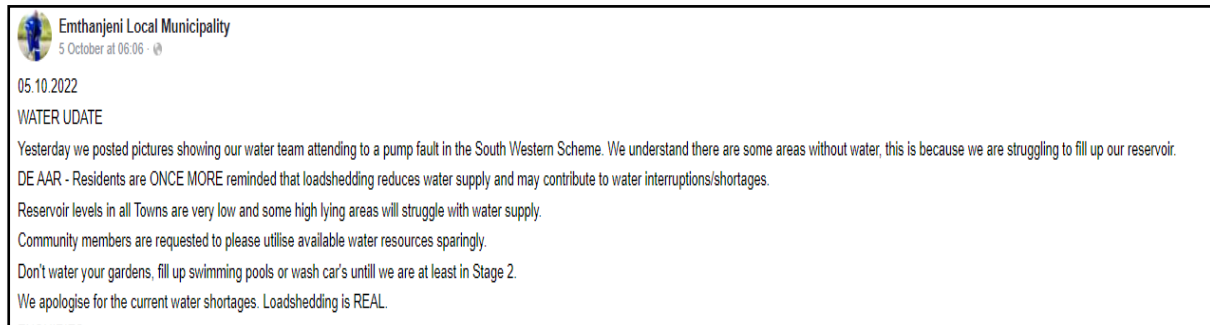
*South Africa 7602*

Appendix 18: Example of a Solar Cooker

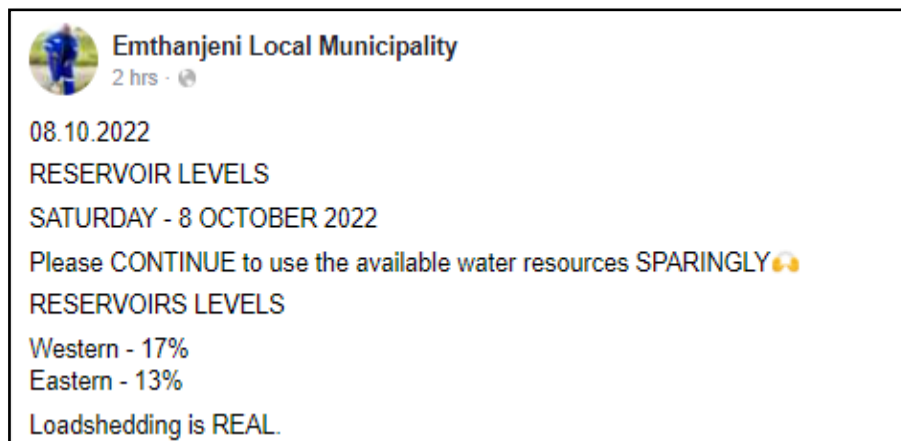


Source: Adobe Stock (standard license), 'Warming the teapot in a solar cooker. Nepal. Himalaya'

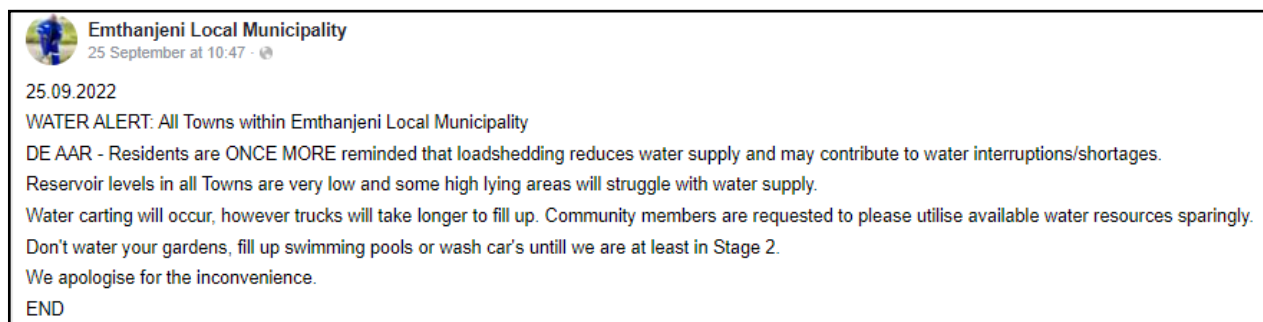
## Appendix 19: Emthanjeni Local Municipality Facebook post regarding water shortage



Source: Emthanjeni Local Municipality Facebook page, 5 October 2022

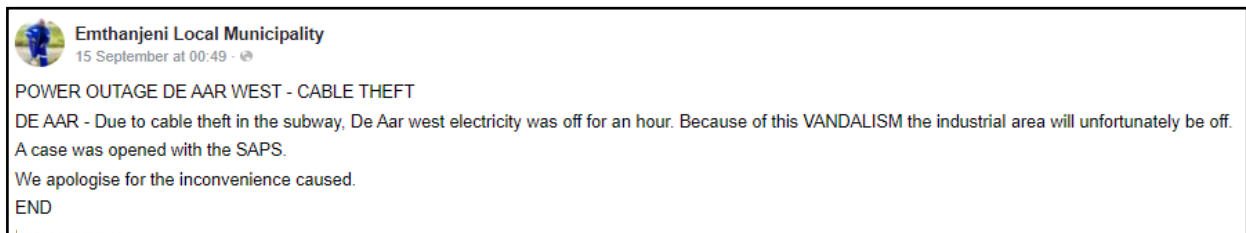


Source: Emthanjeni Local Municipality Facebook page, 8 October 2022

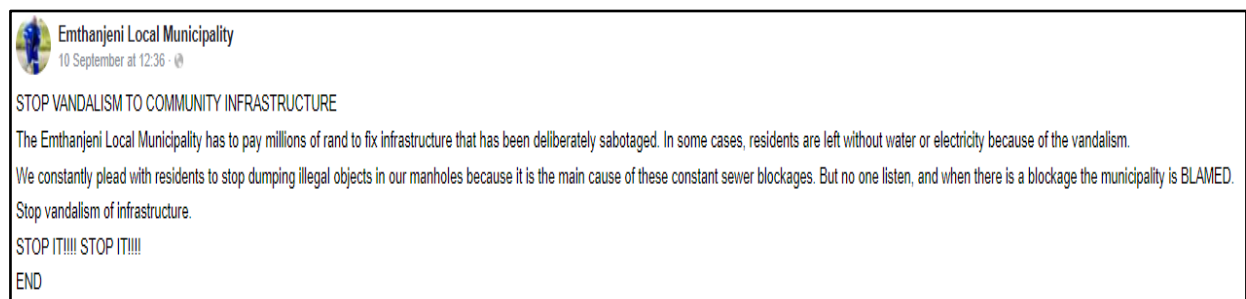


Source: Emthanjeni Local Municipality Facebook page, 25 September 2022

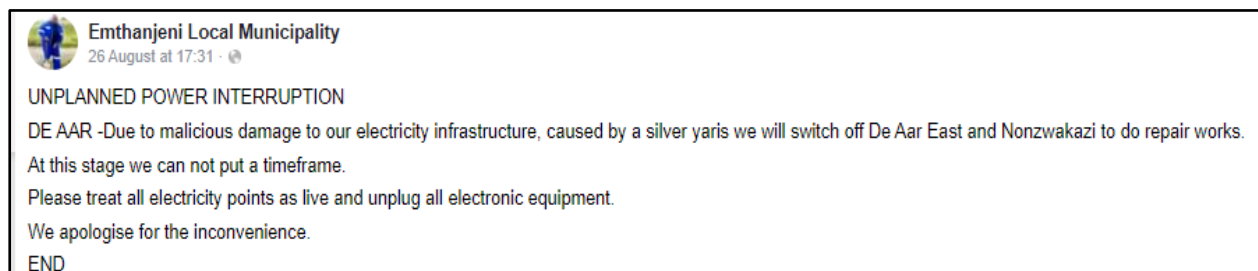
## Appendix 20: Emthanjeni Local Municipality Facebook messages regarding vandalism and theft



Source: Emthanjeni Local Municipality Facebook page, 15 September 2022



Source: Emthanjeni Local Municipality Facebook page, 10 September 2022



Source: Emthanjeni Local Municipality Facebook page, 26 August 2022

Appendix 21: The underpass in De Aar



Photographed by Stephanie Borchardt, May 2021



Appendix 22: Open fields adjacent to Kareeville



Photographed by Stephanie Borchardt, October 2017



Photographed by Stephanie Borchardt, October 2017

Appendix 23: De Aar's waste disposal facility



Photographed by Stephanie Borchardt, April 2018

Appendix 24: Solar Capital business training advert and manuals



Photographed by Stephanie Borchardt, September 2017