# THE ROLE OF SOCIO-ECONOMIC DEVELOPMENT PROJECTS BY RENEWABLE ENERGY COMPANIES IN THE DAWID KRUIPER LOCAL MUNICIPALITY, UPINGTON, IN THE NORTHERN CAPE PROVINCE

**By**

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## DECLARATION

I, **Babalwa Constance Mbobo**, declare that the thesis **"ROLE OF SOCIO-ECONOMIC DEVELOPMENT PROJECTS BY RENEWABLE ENERGY COMPANIES IN THE DAWID KRUIPER LOCAL MUNICIPALITY, UPINGTON, IN THE NORTHERN CAPE PROVINCE"** now submitted for the qualifications of **Masters in Development Studies** at the **University of the Free State**, is my work and that I have not previously submitted the same work for a qualification at another institution of higher learning.

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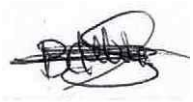

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## ABSTRACT

This study examines the socio-economic and economic development undertaken by renewable energy projects under the REIPP programme in Upington, in the Dawid Kruiper Local Municipality (DKLM) in South Africa. The researcher analysed secondary data and applied a qualitative methodology. The semi-structured key informants' interviews and focus groups were used when collecting the data. The research participants, who were mostly community members, detailed their views and experiences of how the renewable energy sector affects their daily lives through the projects they have in their vicinity. This study revealed significant changes in renewable energy South African policies and strategies from the White Paper on Renewable Energy, promulgated in 2003, up to the REIPPP programme established in 2011. The REIPPP programme is a government-led procurement programme that aims to increase the share of renewable energy in the national grid by procuring energy from IPPs, especially now that the country is faced with energy insecurity challenges.

The study continued in discussing participants' views about renewable energy projects. For decades it has been a known fact that renewable energy addresses the ever-growing demand for electricity while addressing climate change issues. In particular, both off-grid technologies and large-scale utility projects offer great potential for both rich and poor communities. Also, it contributes to economic development criteria, which includes local job creation, local ownership, social and economic development. However, community members raised concerns in relation to job creation, environmental impacts and socio-economic challenges. Some of the views are that there is limited job creation for local communities, there are negative environmental impacts and there are also negative consequences in relation to socio-economic aspects in host towns.

In mitigating the adverse effects raised by community members, the study recommends that projects must have community acceptance and support from all stakeholders, including local municipalities. All host communities must be engaged, there must be a proper consultation, and all members must be aware of the positive effects and negative effects of projects. In relation to socio-economic issues, renewable energy companies need to fund and implement related projects that will address community needs and the negative consequences emanating from project implementation. It is therefore recommended for local communities to be vested in the long-term presence and success of renewable energy projects and also acceptance, and they

need to see tangible and authentic benefit sharing from the projects. They need to be involved in all project stages.

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| | |
|---|---|
| COP | Conference of Parties |
| CSP | Concentrated Solar Power |
| DKLM | Dawid Kruiper Local Municipality |
| DMRE | Department of Mineral Resources and Energy |
| DoE | Department of Energy |
| ED | Economic Development |
| ERA | Electricity Regulation Act |
| FDI | Foreign Direct Investment |
| GDP | Growth Development Product |
| GW | Giga Watt |
| IDP | Integrated Development Plan |
| IEP | Integrated Energy Plan |
| INSPIRE | Initiative for Social Performance in Renewable Energy |
| IPAP | Industrial Policy Action Plan |
| IPPs | Independent Power Producers |
| IRENA | International Renewable Energy Agency |
| IRP | Integrated Resource Plan |
| MW | Mega Watt |
| NERSA | National Energy Regulator of South Africa |
| PV | Photovoltaic |
| REIPP | Renewable Energy Independent Power Producer |
| SAPVIA | South African Photovoltaic Association |

| | |
|---|---|
| SAWEA | South African Wind Energy Association |
| SDG | Sustainable Development Goals |
| SED | Socio-Economic Development |
| SONA | State of the Nation Address |
| UN | United Nations |
| UNFCCC | United Nations Framework Convention of Climate Change |

# CHAPTER 1 :
# SETTING THE SCENE

## 1.1 INTRODUCTION AND BACKGROUND

Renewable energy, for which the Kyoto Protocol laid the foundation (UNFCCC, 1992), is becoming prominent (GCIS, 2018). South Africa was a signatory to the Kyoto Protocol in 2002. In addition, South Africa signed the Paris Agreement with the United Nations Framework Convention on Climate Change (UNFCCC) in New York in 2016. South Africa reported progress at the latest Conference of Parties (COP26). Renewable energy development is needed as a matter of urgency (Hosseini, 2020). The clean energy sector is also one of the initiatives targeted in the 2030 Sustainable Development Goals (SDGs) by the United Nations (UN). Countries like China, the United States, Germany and the United Kingdom have set ambitious goals in their renewable energy policies for 2050 (Amansure & Adendorff, 2017).

In South Africa, the Department of Energy (DOE) initiated renewable energy through the Renewable Energy Independent Power Producers Programme (REIPPP) in 2011. REIPPP is one of the DoE's initiatives to meet the goals of the National Development Plan 2030 (GCIS, 2018). REIPPP has generated R136 billion in foreign investment. The eventual target is to provide 20 000 MW of energy from renewable sources by 2030. In 2009 in Copenhagen, the South African government pledged to implement mitigation measures and end coal-fired power stations. The country produces more than 90% of its electricity from coal-fired power stations (Craig, Brent & Dinter, 2017).

Under the REIPPP programme, the Northern Cape Province is host to all of the concentrated solar power (CSP) plants and 65% of photovoltaic (PV) plants in South Africa (DoE, 2019). These projects contribute 2152 MW of 2972 MW of solar power (72% of the total renewable generation under the REIPPP programme). In addition to providing electricity, the independent power producers must implement socio-economic and economic development programmes. Socio-economic development usually addresses problems like unemployment, poverty and inequality.

## 1.2 PROBLEM STATEMENT

The South African REIPPP programme is globally perceived as one of the most successful programmes of its kind (Leigland & Eberhard, 2018). The Department of Mineral Resources and Energy requires every renewable energy investor under the REIPP programme to give back to the community through Socio-Economic Development (SED) and Economic Development (ED) initiatives. These investments must occur within a 50-kilometre radius of the development (DoE, 2019). REIPP's companies report quarterly to the DoE about their SED and ED initiatives. In many cases, renewable energy producers have created community trusts. These developments can potentially address regional inequality and unemployment and alleviate poverty. Despite these initiatives, there seem to be few tangible socio-economic development outcomes, and projects tend to create local conflict and collaboration with local governments is limited. Overall, local acceptability of these new energy projects remains limited for several reasons. This is a risk factor that needs to be understood and managed more appropriately.

## 1.3 AIM AND OBJECTIVES

This study examines the socio-economic development undertaken by renewable energy projects under the REIPP programme in Upington, in the Dawid Kruiper Local Municipality (DKLM) in South Africa and asks the question whether these programmes create local ownership and acceptability. The dissertation has the following objectives:

i. To identify the gaps in socio-economic development for renewable energy projects in Upington through the REIPP programme.
ii. To understand how the local people experience socio-economic development programmes.
iii. To make recommendations about policy proposals.

## 1.4 GLOSSARY OF TERMS

The following terms follow part of the study and a definition of terms is required.

**Renewable energy**: The energy from a source that is not depleted when used. It can be used continuously. Such energy includes wind, solar and tidal power (IRENA, 2021).

**Independent power producers**: Companies that have been awarded the right to build and operate renewable energy facilities (Intellidex, 2021).

**Kyoto Protocol**: It is an international treaty among industrialised nations that sets mandatory limits on greenhouse gas emissions (GCIS, 2018).

**Social performance Initiatives**: It is an outcome of companies' engagement with community activities and commitments that can directly or indirectly impact stakeholders and community members (INSPIRE, 2021).

**Community members**: Members that can be directly or indirectly affected by the renewable energy development project. Community members include all who live, work, learn, play and pray in communities (IFC, 2019).

**Quality of life**: The standard of comfort, health and happiness experienced by an individual or a group in a particular area (IIED, 2013).

**Upington town in the DKLM**: A study area which is a small town founded in 1873, located in the Northern Cape Province and lies on the banks of Orange River. It falls under DKLM, a municipality previously known as //Khara Hais Municipality (LED, 2017).

## 1.5 RESEARCH METHODOLOGY

The research approach is qualitative. Qualitative research presents close collaboration between the participants and the researcher. It makes participants open-up and share their stories without restraint (Maree, 2016). The collected data focused on community members' perceptions, experiences, and expectations of renewable energy developments associated with their local benefit.

### 1.5.1 Research area

Upington is a town in the DKLM, and the focus area for this study. The DKLM is a category B municipality that falls under ZF Mgcawu District Municipality. The area is a popular tourist destination with long sunny days and warm weather. The Auditor-General SA reported that DKLM is one of the best-run municipalities in the Northern Cape, having had a clean audit for successive years (AG, 2021). DKLM borders the Kgalagadi Transfrontier Park, Botswana in the northeast,

and Namibia in the west. DKLM is part of five municipalities making up ZF Mgcawu District Municipality. These five municipalities jointly form or are part of the greater ZF Mgcawu District Municipality and are shown in Figure 1.1 below.

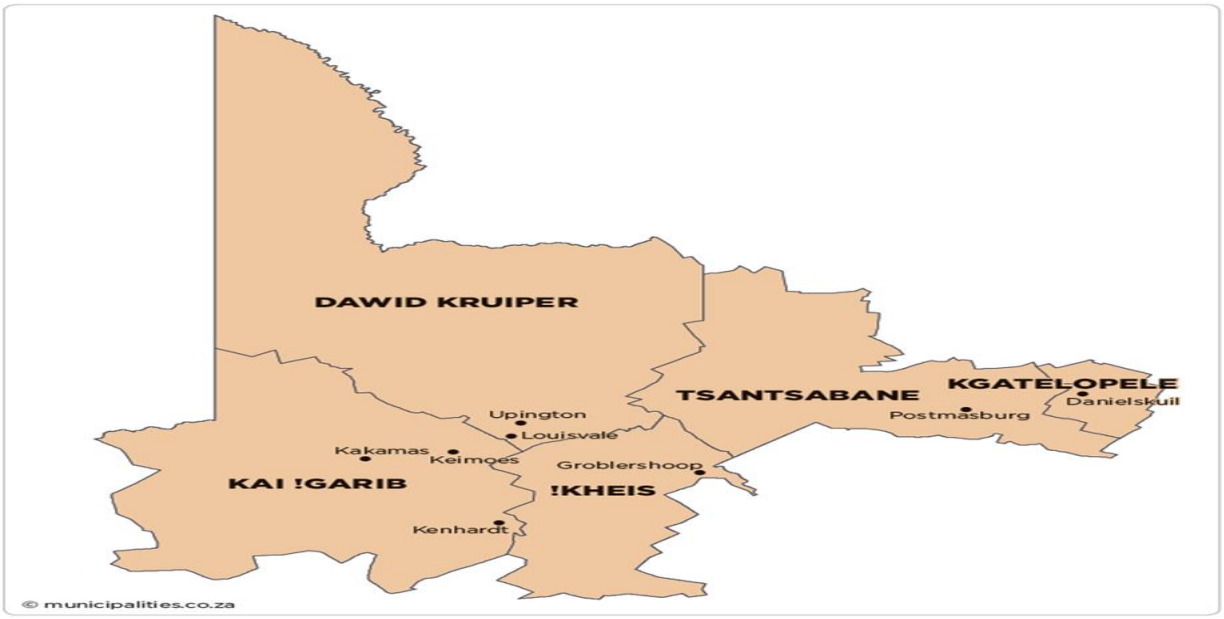


***Figure 1.1: Location of Dawid Kruiper Municipality, Upington town within the ZF Mgcawu District Municipality (Source: LED Strategy)***

Dawid Kruiper Local Municipality consists of three main/major towns, namely:

- Askham
- Rietfontein
- Upington

During the 2015/16 municipal financial year, the //Khara Hais Municipality and Mier Municipality were merged to form part of DKLM.

In DKLM, there are four renewable energy projects surrounding Upington town. The four renewable energy projects within a 50-kilometre radius are Scatec Solar Dyason's Klip 1 and 2, Xina Solar One- Abengoa, Khi Solar One-Abengoa, and Ilanga-Karoeshoek solar projects (see Table 1.1 below).

***Table 1.1: Solar farms in the DKLM, Upington surrounding under the REIPP programme***

| **Solar Farm** | Scatec Dyason's Klip 1 & 2 | Xina Solar One Abengoa | Ilanga-Karoshoek | Khi Solar |
|---|---|---|---|---|
| **Technology** | Photovoltaic | Power Tower-CSP | Parabolic Trough-CSP | Power Tower-CSP |
| **Start year** | 2018, 2020 | 2016 | 2018 | 2016 |

*(Source: own compilation)*

The Spanish technology group, Abengoa, was responsible for the first solar farm in the DKLM and employed approximately 2 000 local workforces in Upington. Scatec Solar, a company that developed photovoltaic, owns and operates solar power plants with a 42% black shareholding. The company is originally from Norway. Ilanga, Karoshoek CSP project has a black South African shareholding and ownership by Emvelo, a local black South African company, and Cobra and Sener from Spain.

The Northern Cape hosts 100 % CSP and 65% solar PV capacity procured in Bid Window 1 up to Bid Window 4. This contributed to 2152 MW of the national total of 2972 MW of solar power, which is 72.4% (DoE, 2019). In his State of the Nation Address (SONA) for three consecutive years, 2020, 2021 and 2022, President Cyril Ramaphosa indicated that the government would be taking significant measures to increase generation capacity outside of Eskom and one of the measures that will be deployed will be to procure emergency power, starting by opening Bid Window 5 for REI4P and other Bid Windows will follow. Table 1.2 below summarises the concentration of these projects in the province.

***Table 1.2: Northern Cape renewable energy projects and GDP contribution***

| **District Municipality** | **Local Municipality** | **GDP contribution to GDP in the province** | **Renewable Energy projects' deployment** |
|---|---|---|---|
| Pixley Ka Seme | Emthanjeni | 2% | 8 |
| ZF Mgcawu | Dawid Kruiper | 9% | 3 |
| John Taole Gaetsewe | Gamagara | 6% | 3 |
| Namaqua | Nama Khoi | 5% | 1 |
| Francis Baard | Sol Plaatjie | 24% | 2 |
| Pixley Ka Seme | Siyancuma | 2% | 3 |

| | | | |
|---|---|---|---|
| ZF Mgcawu | Kai! Garib | 5% | 11 |
| Namaqua | Hantam | 2% | 3 |
| John Taole Gaetsewe | Joe Morolong | 3% | 3 |

*(Source: DoE, 2019)*

The Northern Cape Province is referred to as the renewable energy hub. ZF Mgcawu, where Upington lies, has the most projects, followed by Pixley Ka Seme in De Aar.

### 1.5.2 Research approach and design

The study uses the secondary data from the project titled “The Impact of the Concentrated Solar Power plant project in the local community of Upington, in the Northern Cape Province in South Africa”. The primary data collected is the intellectual property of the Centre of Development Support. The study investigates the local effects and mitigation factors of renewable energy plants in Upington. The Centre for Development Support conducted interviews at Raaswater, Keimos and Upington. Sites were selected because of their vicinity to the renewable plants.

The project used two research methods: first, the research team used semi-structured interviews with 16 key informants via telephone and face-to-face. The interviewees included representatives from the following sector: utilities, project developers, CSP operators, policymakers, project planners, government organisations, and academia. The interviews focused on negative local impacts and the existing ED and SED programmes of renewable energy companies.

The second method entailed six focus group meetings. The participants in each focus group were as follows: the first focus group had seven participants in Upington. In Raaswater there were two focus groups, namely Raaswater 1 and Raaswater 2, they comprised of seven and four participants respectively. The third focus group had eight participants from Louisvale. The fourth focus group had 10 participants from Kalksloot. The last focus group had four participants from Keimoes 1. The Centre for Development Support took part in focus group. The following factors influenced the organisation of the focus group: traditions of having mixed-gender groups, local culture, age group and income. The research teams were explicitly interested in the perception of the benefits of the CSP plant to the nearby residents.

The research followed a case study design. The case study design helped assess the socio-economic development situation in implementing renewable energy in South Africa. A wide variety of data is used.

### 1.5.3 Data collection strategy

The focus group and key informant interviews were used to collect primary data for this study. This semi-structured interview used in data collection gave the interviewer and interviewee a space to give more details (Korstjens & Moser, 2017). It is a very helpful interview in conducting different research approaches to socio-economic development as it gives participants guidance (Liao & Hitchcock, 2018). The qualitative methods for data collection were used for this research: in-depth interviews and focus groups. This assisted in exploring the views of individuals on this specific research topic. The collection strategy gave respondents an opportunity for a detailed and personal explanation of the topic. Respondents unpacked their views and experience in implementing socio-economic development when dealing with renewable energy projects. The researcher and or interviewer came up with a list of question points to guide the discussion when the interview started.

The data was meant to assess the socio-economic and livelihood impacts of CSP plants on local communities. This information is relevant to this research as the research seeks to examine the role of socio-economic development in renewable energy development areas such as Upington in the DKLM. The following factors influenced the organisation of the workshops: traditions of having mixed-gender groups, local culture, age groups and income. The research teams were explicitly interested in the perception associated with costs and benefits of the CSP plant on the nearby residents, the CSP plant's impact on water resources' availability and any changes imposed upon their daily lives. The following issues were central to the research: community benefits to the public, community ownership, acceptability of RE projects, lack of public trust and importance of place attachments.

After obtaining consent, the research team recorded the discussions for both the focus group and interviews. The interview sessions were held telephonically and face-to-face, and also for the focus group, were conducted physically. The research team transcribed all the interviews during the data collection stage. At the end of the primary data collection, the researcher transcribed the data from the audio recorder and labelled them according to the location of the focus group

participants, as outlined in Table 1.3. In the case of the key informants, the participants were allocated numbers as outlined in Table 1.4.

### 1.5.4 Sampling design

This research uses a non-probability sampling technique for the collection of data. In qualitative research, data saturation is very important (Korstjens & Moser, 2017). It is suggested that for qualitative research, several sample sizes should not be too much or not be too small in such a way that it is difficult to achieve data saturation (Bryman, 2012). For the focus group a total of 40 participants (see table 1.4) were interviewed and 16 key informants semi-structured interviews (see table 1.3) were conducted. A total of 56 sample size interviewed in this study. These respondents are relevant to the study as they come from the REIPP 50-kilometre radius. This is a suitable sample size and it has the potential to represent the population better and socio-economic development is facilitated at a local municipality level (Mbecke & Mokoena, 2018).

***Table 1.3: Interview participants' profile***

| Interviewee number | Capacity of interviewee |
|---|---|
| 1 | Businessperson: the transport industry |
| 2 | Politician (Councillor) and business person |
| 3 | Community Liaison: solar plant |
| 4 | Businessperson: construction |
| 5 | Engineer |
| 6 | Local Municipality |
| 7 | Social worker |
| 8 | Estate Agent |
| 9 | NGO |
| 10 | Department of Environmental Affairs |
| 11 | Department of Environmental Affairs |
| 12 | Businessperson and contracts with CSP plant |
| 13 | Businessperson |
| 14 | National African Farmers Union |
| 15 | Industrial Development Corporation |
| 16 | Department of Economic Affairs |

***Table 1.4: Respondents' demographic and biographic data***

| Focus group | Participants | Profile |
|---|---|---|
| Raaswater 1 | Interviewee 1 | Unemployed |
| | Interviewee 2 | Farmer/Councillor |
| | Interviewee 3 | Housewife |
| | Interviewee 4 | Care worker |
| | Interviewee 5 | Unemployed |
| | Interviewee 6 | Unemployed |
| | Interviewee 7 | Community development worker |
| Raaswater 2 | Interviewee 1 | Care worker |
| | Interviewee 2 | Community Works Programme |
| | Interviewee 3 | Community Works Programme |
| | Interviewee 4 | Community Works Programme |
| Upington | Interviewee 1 | Nurse/Farmers wife |
| | Interviewee 2 | Financial advisor |
| | Interviewee 3 | Pensioner/Retired librarian |
| | Interviewee 4 | Housewife |
| | Interviewee 5 | Student |
| | Interviewee 6 | Housewife |
| | Interviewee 7 | Retired teacher |
| Kalksloot | Interviewee 1 | General worker |
| | Interviewee 2 | Builder |
| | Interviewee 3 | Unemployed |
| | Interviewee 4 | Unemployed |
| | Interviewee 5 | Unemployed |
| | Interviewee 6 | Unemployed |
| | Interviewee 7 | Unemployed |
| | Interviewee 8 | Spaza shop owner |
| | Interviewee 9 | Unemployed |
| | Interviewee 10 | General worker |
| Louisvale | Interviewee 1 | Student |
| | Interviewee 2 | Learnership |
| | Interviewee 3 | Housewife |
| | Interviewee 4 | Pensioner |
| | Interviewee 5 | Pensioner and Housewife |
| | Interviewee 6 | Learner |

| | | |
|---|---|---|
| | Interviewee 7 | Police officer |
| | Interviewee 8 | Unemployed |
| Keimoes 1 | Interviewee 1 | Vice-principal |
| | Interviewee 2 | Unemployed |
| | Interviewee 3 | Occupational health & safety officer |
| | Interviewee 4 | Unemployed |
| **N= 6** | **N=40** | |

## 1.6 DATA ANALYSIS

Data analysis incorporates various elements by breaking down acquired research data into smaller, manageable information pieces (Bryman, 2012). The process of breaking down data enables the researcher to better understand several aspects of the data collected. Thematic analysis is used to analyse qualitative data since this study follows a qualitative approach. Through thematic analyses, the researcher can identify differences and similarities in data. The secondary data analysed in this study is to understand the socio-economic development concerning targets sets by all stakeholders involved. The secondary data safekeeping is important in comparing with any other available data.

## 1.7 RESEARCH ETHICS

The researchers must obtain approval from the ethics committee when researching to curb the moral reflex of researchers (Bryman, 2012). Ethical issues, such as voluntarily participation, confidentiality, and respect were adhered to and exercised as per the national and international research protocols (Liao & Hitchcock, 2018). There have been several cases where researchers bypassed the process of ethics approval; it could be that the researcher is unaware of the importance of ethical approval. It is the researcher's responsibility to consult the ethics committee for approvals and advice on ethical waivers. Ethical issues cannot be ignored due to their important link with the integrity of the study (Bryman, 2012). The University ethical clearance committee approved the original project. This is very important in social research because there is potential harm to individuals, invasion of privacy, lack of informed consent and deception. Participants received an introductory letter, participated voluntary, signed an informed consent form and gave permission to use the audio recording. The research also guaranteed confidentiality and privacy. The data is available only for UFS research.

## 1.8 LIMITATIONS

The anticipated limitations of this study are that the data collected will only be confined to Upington REIPP projects. This is due to financial and time constraints.

## 1.9 OUTLINE OF THE STUDY

The study overview is outlined in five chapters below.

**Chapter 1 (Setting the scene),** the chapter has dealt with the introduction and background of the study. The study's problem statement, aim, objective, and methodology are reflected in this chapter and how the researcher conducted the study.

**Chapter 2 (Literature review on renewable energy: global perspective)**, this chapter analyses the socio-economic contribution and issues focusing on a global perspective. The chapter also provides more literature on socio-economic and economic contributions to communities where there are renewable energy developments.

**Chapter 3 (Renewable energy policy in South Africa)** this chapter is narrowed to South Africa's legislation about renewable energy in South Africa. The Republic of South Africa's national legislation on renewable energy is assessed, focusing more on the socio-economic and economic contribution. Other strategies and policies directly linked to the renewable energy's independent power producer programme like climate change, development plans and growth paths are also assessed.

**In Chapter 4 (Research findings and analysis),** the secondary data is analysed in this chapter. The secondary data are from the University of Free State, Centre for Development Support. An extensive data analysis identifies the effects of renewable energy developments in local communities.

**Chapter 5 (Main findings, recommendations and conclusion),** the final chapter summarises the research and identifies the study's main findings. The recommendation and future research are also identified.

# CHAPTER 2 :
# LITERATURE REVIEW

## 2.1 INTRODUCTION

Historically, the world depended on conventional energy like coal-fired power station energy sources (Rizvi et al., 2020). However, this has not solved all developmental problems. For example, over 573 million people have no access to clean electricity in the African continent alone, and there is an over-reliance on coal, forests, and fuelwood for cooking (Antwi & Ley, 2021). The reliance on forests and fuelwood is unsustainable, and over 195 countries worldwide pledged to decarbonise using the Sustainable Development Goals (SDG) 2030 from the United Nations (Karaman et al., 2021). The SDGs came after the expiration of the Millenium Development Goals (MDG) in 2015 (Lin & Kaewkhunok, 2021). SDG 7 emphasises the access of clean, reliable and cheap energy by all in 2030 (Lin & Kaewkhunok, 2021). Renewable energy initiatives undertaken by companies and nations that fall under clean energy on the SDG are persistent in meeting the targets set to be achieved by 2030 and report to the United Nations (Antwi & Ley, 2021).

There are negative environmental impacts through conventional energy generation. These negative impacts prompted environmental and social activists to raise awareness of the negative consequences of coal-fired stations' energy generation (Thapa, 2020). The greenhouse gas emissions emitted from coal-fired stations cause global warming. The greenhouse gas doubled in the past century because of energy generation (Shahbaz et al., 2020). China is experiencing severe environmental degradation due to $CO_2$ emissions as the country experienced rapid economic growth (Sarkodie et al., 2020). At the same time, China ranks on top in the transition from conventional energy to clean energy technologies. The clean energy technology sector plays a critical role in job creation, transport, agriculture, commerce and economic development, communication, modern health facilities and education. The clean energy sector also plays a key role in eliminating poverty and contributing to economic growth (Wang et al., 2018). Furthermore, the clean energy sector's new large-scale and small-scale renewable projects positively affect infrastructure and socio-economic development in local communities. In this chapter, the researcher discusses the international experience regarding what companies in the renewable energy sector do to avoid negative local consequences. The researcher discusses the following issues that help to ensure local acceptability: community ownership, mitigation of local impacts,

providing cheaper energy access, ensuring local buy-in through a social licence to operate and managing local effects and investments.

## 2.2 COMMUNITY OWNERSHIP

One way to make large-scale renewable infrastructure projects locally more acceptable is to provide local or community ownership. Renewable energy companies are obliged to share ownership and revenue with local communities. This obligation places renewable energy companies as a significant contributor to community development, the country's transformation agenda and development of rural communities (Wlokas, Westoby and Soal, 2017). As early as the 1970s, citizens in Europe took ownership of renewable energy through community energy ownership (Roberts, 2020). Since then, community ownership of energy projects has become common. Community ownership fosters local involvement, participation and co-ownership of communities. The European Union (EU) legislated community ownership of renewable energy through Clean Energy for All Europeans Legislative Package (CEP) (Roberts, 2020). Community shareholding ensures local shareholders and provides local communities with control (Soeiro & Dias, 2020). Community ownership contributes to the local benefits of projects (Van de Waal, 2020).

Consumer co-ownership is another model introduced in Europe. Consumer ownership means going directly to the wholesale energy market and enabling up to 75% of savings. According to the Renewable Energy Directive (RED) II introduced in Europe in 2018, the consumer stock ownership plan is the new governance model and will become law in all European Union Member States by 2021 (Conradie et al., 2021). The Renewable Energy Directive II, promulgated in 2018, introduced the Renewable Energy Community (REC) as a legal entity active in energy production. The Renewable Energy Community is a method that will allow low-income households and individuals to have an additional source of income (Lowitzsch, 2020). For example, the Danish government introduced an incentive to support local ownership to decentralise small-scale renewable energy to allow poor households to gain an additional source of income (Clausen & Rudolph, 2020). These poor households would generate power, and extra energy produced would be connected to the grid and sold to consumers. In Flanders, Belgium, community ownership is done through Citizen Energy Community (CEC). Communities also trade the locally produced energy from their yard. This energy generation could be from a solar rooftop, hybrid wind turbine or a bio-digester plant. Through profits, this ensures a better life for all through REC in the

European Member States (Conradie et al., 2021). For years Germany has been using the Citizen Energy Community (CEC). There are economic, social and community benefits for investing in CEC in Germany. The CEC differs from REC as it does not stipulate that membership depends on geographic proximity (Conradie et al., 2021). Renewable energy CEC and REC are primarily related and address broader socio-economic factors and societal inequality.

Community-based renewable energy projects were also implemented on Sumba Island in Eastern Indonesia. Community-based renewables address social justice and energy access, especially in remote areas. Community-based renewables do not only address rural energy poverty, but energy social justice as well. The social justice of energy access includes community groups' fair decision-making through local community cooperatives (Fathoni et al., 2021). The UK was also an early adopter of community renewable energy projects. Communities in the UK have potential ownership of energy markets, distribution networks, and energy service supply (Nolden et al., 2020). The benefits of the potential of ownership in energy markets are socio-economic benefits for all community members. In Canada, communities have equity ownership in renewable and community energy, which helps social cohesion amongst the many indigenous ethnic groups (Hoicka et al., 2021). In the USA, projects located in rural areas raise wages by 2% through ownership stakes, lease payments, and increase revenue to local government (Mauritzen, 2020). Local people benefit financially, especially for projects between 1 to 400 megawatt (MW). Linnerud et al. (2019) indicate that in Norway, community ownership communities have little faith in projects that are frequently changing community ownership, as well as local and national ownership.

Community trust funds can improve and enrich a particular community and municipality within the project jurisdiction. Community trusts in renewable energy projects empower communities to benefit from development projects and become entitled to inheritance (Van de Waal, 2020). Community trust plays a role in progressing renewable energy developments (Soeiro & Dias, 2020). However, trusts can leave people disillusioned if not managed properly. This has been the case in the Netherlands Orcadian community-led wind energy project. Lower than expected revenue streams can affect the trust's income (Van der Waal, 2020). For example, in solar farms where weather conditions' cloud cover takes longer than expected, the revenue stream will be lower. Another example is a community trust in Orkney, the Scottish island of Shapinsay, which lost a yearly income due to production exempting the Climate Change Levy tax (Van de Waal, 2020). The UK government terminated the levy exemption certificate, resulting in the trust losing approximately 8000 pounds of its yearly income, since the production was no longer exempted

from the Climate Change Levy tax. The consequences were that the community trust lost income, and community members could not benefit financially as was anticipated. Legal issues are also commonly identified in community trusts, equality and non-discrimination issues in community trusts, where some members have more equity stakes than others, and the association to community leaders put some community members in an advantageous position to have more than others (Roberts, 2020). The international experience shows that a community trust requires proper management as they empower the surrounding communities, and communities benefit in some instances, even for future generations after years of technology decommissioning.

Overall, many examples of renewable energy companies ensure local and community buy-in through shares, individual contributions, or community ownership models. These are all attempts to ensure that these large infrastructure projects obtain local acceptability.

## 2.3 MITIGATING NEGATIVE IMPACTS

Another way of ensuring local acceptability is to mitigate the local consequences of these large infrastructure projects. Renewable energy has attracted substantial attention worldwide, concerning environmental, economic, and technical impacts. Renewable energy plays a significant role in reducing the environmental impacts of reducing emissions in all continents globally. The technology also reduces energy poverty and demand (Namahoro et al., 2021).

Landscapes experience positive impacts, especially where there is renewable energy development. However, there are also adverse effects. For example, wind energy creates negative visual effects. Wind energy technology is the cause of massive landscape changes (Ioannidis & Koutsoyiannis, 2020). Wind energy also poses a threat to bird species. There are growing concerns internationally on noise and vibration from wind turbines and electromagnetic radiation voltage power lines that can cause health risks for community members (Delicado et al., 2016). During the public process, participation of community members and environmentalists curbed local impacts and legislation concerning species' displacement and buffer zones to address all environmental issues in wind energy technology. In contrast, the public in European countries, like Denmark and Scotland, compliments wind energy to sanctify landscapes and perceive projects as sustainable and human. The well-groomed lawn planted in most wind farm turbines leads the eye to nice green landscapes and a wind turbine which is usually white, and stands out. Wind turbines, in particular, are tall structures that can be visible from long distances and have a high potential to impact landscapes and visual resources. The

visual impact of a wind farm depends on the distance from it, weather conditions, turbine siting and the landscape on the effect of distance on the perception of a wind farm in an open landscape (Ioannidis & Koutsoyiannis, 2020). Many villages and small cities are affected in Portugal and Spain, especially wind energy that affects the local community aesthetically. In visual terms, solar energy projects are less tricky (Delicado et al., 2016).

The concentrated solar plant (CSP) plants have negative impacts on the livelihoods of the communities. In many cases, the technology harms the local community. The direct light coming from the mirrors during the daytime, negatively impacts the local community. The bright light can impact flights or other transportation within the vicinity and nearby households (Karim et al., 2020). Another negative impact on CSP technology is water consumption; water is one of the most valuable necessities. The mitigating factor was introducing a dry-cooling technology system, which consumes less water.

Foreign direct investment plays a key role in promoting economic development through economic growth and environmental sustainability (Sarkodie, Adams & Leirvik, 2020). Several uncertainties in the economic policy hampered foreign direct investments in the energy sector (Ahmed, 2021). The energy sector is one of those foreign direct investors that invested massively through renewable energy development.

Many countries consider renewable energy primarily for environmental, social, and economic benefits. The social impact assessment of renewable energy's development indicators focuses on public awareness, employment, local infrastructure development, health and safety and energy stability (Huang et al., 2021). The local resistance is a significant obstacle to renewable energy development in Europe, as it causes social opposition. Some social conflicts and antagonisms can cause delays and, in some instances, cancellation of projects, as has been the case in Mexico (Martinez & Komendantova, 2020). Governments, companies and international banks have adopted policy tools and regulations, such as social impact assessments, to address these concerns. Most project plans include social aspects in the planning and decision-making of renewable energy projects. The social impact assessment is a critical tool in project design and planning. The tool assists with the social involvement of all vital stakeholders, like government implementation agencies, regulatory, institutional designers and consultants (Martinez & Komendantova, 2020). A social impact assessment should include all communities, poor and remote areas. Countries such as China introduced a Photo-voltaic Poverty Alleviation (PVPA) programme, a unique programme addressing social ills in the poor rural outskirts. The programme

ensures that 25 provinces and poor households benefit and address social opposition (Huang et al., 2021).

The environmental impact assessment secures social and environmental impacts for the democratic decision-making process. Many environmental impact assessments have disputes, and sometimes community members form protest groups to stop the project (Larsen et al., 2018). Wind energy and the electricity grid extension are mostly complex projects where social conflicts erupt. In Denmark, environmental and social conflicts in renewable energy development caused turmoil amongst policymakers locally and nationally. Due to disputes and opposition, the government abandoned plans and policies and even cancelled projects. These conflicts can also harm communities, if not managed well. The disputes and environmental impact assessments need appropriate management to ensure positive outcomes. In cases where there is no proper management, conflicts can arise. It can cause harm to social relations' community divisions, increase the risk of violence, and undermine trust within communities (Mousavi-Avval & Shah, 2021).

## 2.4 PROVIDING CHEAPER ENERGY ACCESS

Renewable energy provides cheaper energy access to communities. Access to cheaper power often causes passive resistance against new energy projects. Communities in rural areas lack access to reliable, affordable and sustainable energy, essential for a better quality of life. Communities in rural areas still rely on kerosene and diesel, which is more polluting than renewable energy. Diesel is one of the most expensive technology available (Zebra et al., 2021). Renewable energy technologies in sub-Saharan Africa can sustainably bridge the energy access gap and foster economic growth (Oluoch et al., 2021). It assists in electricity supply, concerning energy and security (Qadir et al., 2021).

Hybrid and mini-grid systems are important in areas with no electrical infrastructure, which are mostly remote. They are considered an optimal solution for rural electrification (Zebra et al., 2021). More than 2 million people in the US and approximately 100 thousand in the UK do not have access to the grid. They use hybrid and mini-grid technologies (Qadir et al., 2021). Rural areas often use hybrid renewable energy systems as a primary energy source. They are reliable and cost-effective. These systems mostly use batteries and generators as backup. Hybrid systems are also applied to overcome the fluctuating nature of renewable energy. They overcome the fluctuating nature of renewable energy, as solar and wind resources are not continuous. The

hybrid system fulfils thermal load and electrical demand (Kahwash et al., 2021). Hybrid and mini-grids are mostly adopted in Asia countries and sub-Saharan countries, such as India, Indonesia, Philippians, Kenya and Nigeria, supported by governmental capital subsidies (Zebra et al., 2021). Hybrid and mini-grid systems lower the cost and ensure access to reliable, affordable and sustainable forms of energy.

Energy storage facilities play a key role in renewable energy access. Renewable energy's battery storage technology has predominantly changed the electric power sector as they provide security of energy access. Recently, there has been a rapid technological improvement in battery storage technology. This improvement posed to play a significant role in future power systems. The declining costs of lithium energy storage batteries and other long-duration batteries have lower energy capacity costs, further promoting renewable energy (Bistline, 2021). The overall prices of renewable energy components declined substantially, due to competition from different companies manufacturing renewable energy technologies (Kahwash et al., 2021).

## 2.5 A SOCIAL LICENSE TO OPERATE

Researchers define the social license to operate as an ongoing acceptance and approval of a project by local community members and other stakeholders (Bice et al., 2017). The concept of a social license to operate has evolved fairly recently from the broader and more established notions of corporate social responsibility and social acceptability. It depends on the idea that institutions and companies need regulatory and social permission to conduct their business. The social license to operate should not be seen as a separate entity. Instead, it is embedded into a legal license (LLO) and political license to operate (PLO). Therefore, social license to operate with critical factors, such as trust and legitimacy is integrated with LLO and PLO (Leeuwerik et al., 2021). Furthermore, the integration of SLO, LLO and PLO is not covered by official government regulation as many people would expect. The issue of not being regulated officially by the government poses a threat, as it is a tool of holding large resource companies to account. It is a negotiation tool or an accountability mechanism focused on social measures used by communities (Wright & Bice, 2017).

The concept of a social license to operate became prominent in the early 1990s. The words 'social licence to operate' refer to a community's acceptance of the operations by a business. The concept originates from the mining industry. Since then, other sectors like the energy sector have followed suit (Dumbrell et al., 2020). Renewable energy projects are generally socially

acceptable. This higher acceptance level shows whether one compares wind energy technology to oil extraction and mining (Stephens & Robinson, 2021). However, they still have local impacts. In Denmark, onshore wind energy projects seek a social license to operate. This is not common in solar energy projects. Wind energy projects are visually noticeable to local communities. Renewable energy is a natural resource industry, and the broader energy industry influences societal attitudes. Societal expectations need to be met by development projects (Dumbrell et al., 2020). Support for enewable energy's social acceptance is derived from making the community content by all processes involved (Tseng et al., 2021).

Social license to operate plays a critical role in communities. There are changes seen in governance, such as seeing societal actors having more influence in a decision-making process through a social license to operate (Leeuwerik et al., 2021). Increasingly, having a social license is essential for operating within democratic jurisdictions. Without sufficient popular support, it is unlikely that agencies from elected governments will willingly grant operational permits or permissions. A social license to operate does not refer to a formal agreement or document, but the real or current credibility, reliability, and acceptance of organisations and projects. A social license to operate addresses industrial development of natural resources, which is not only of interest to actors, such as investors and community members, but also include issues of acceptance, legitimacy, procedural fairness, knowledge and information of wider importance. The social license to operate is a tool to address significant problems and an indicator to identify deficiencies in an institutional framework (Poelzer et al., 2020). Researchers frame the relationship between a corporate entity and civil society, often represented by communities, non-government organisations or more informal groupings (Wright & Bice, 2017).

Criticism on a social license to operate is seen as an industry response to opposition and a mechanism to ensure the sector's viability in the mining sector and other relevant sectors (Bice et al., 2017). The concept of a social license to operate, remains conflicted as it implies that the subject may be more complex and broader than conventional conceptualisation. While corporate social responsibility is the dominant business case, regarded as limited in companies, the demonstration of their economic contribution to stakeholders is vast (Bice et al., 2017). There can also be a poor reputation and much distrust among local people when there is much media attention with different perceptions in a project, as this was the case in Groningen Province in the Netherlands, where after the effect of a social license to operate was lost (Veenker & Vancay, 2021).

The social license to operate is becoming a norm for many countries, the need to have it is growing, and it is a changing the landscape of national and international governance, civil society governance and market-oriented governance (Gray et al., 2020). The social license to operate has an increasing emphasis on stakeholder engagement and social responsibility. A social license to operate in local communities becomes key to governance (Stephens & Robertson, 2021). For almost two decades, the social license to operate has focused on an industry perspective, and company-driven stakeholders and governance were not covered until lately (Nyembo & Lees, 2020). Public participation and stakeholder engagement are key in addressing risks emanating from the project before getting a social license to operate. A social license to operate engagements is about obtaining public acceptance and support from local stakeholders (Mulyasari et al., 2021). It is not easy to grant the social license to operate as a partner in the process. At times, there is no community cohesion with local presentation and community inability in raising their needs (Nyembo & Lees, 2020). A social license to operate processes before attainment, requires community acceptance, social justice and stakeholder perceptions. Norway's local interests weigh heavily as it is a united state (Inderberg et al., 2020). Renewable energy development projects are generally socially acceptable by the communities nearby, due to the benefits of creating social value.

Corporate social responsibility (CSR) is a progressed global context practised and an interplayed dynamic. Corporate social responsibility originates from philanthropy and ethics that help round out socially responsible expectations on modern organisations, striving to be sustainable in a competitive, global, dynamic marketplace (Carroll, 2015). There has been a rising interest in corporate social responsibility globally, especially in the last decade. Corporate social responsibility has become a standard practice by most companies (Karaman et al., 2021). The mining sector initially implemented corporate social responsibility and, recently, also the energy sector. Both sectors must engage in socially and environmentally responsible activities to improve the quality of life for communities residing near project developments (Shahbaz et al., 2020). Corporate social responsibility is not favoured by many. Some researchers argue that shareholding equity and partnership is more sustainable than corporate social responsibility. Equity shareholding gives more long-term benefits to society than corporate social responsibility (Karaman et al., 2021). Corporate social responsibility is an explicit framework to understand the business and society relationship better (Carroll, 2015). Despite some positive responsibility corporate social faces, there are sometimes some challenges when it is being implemented. These challenges include some community members refusing to work with companies when potential conflict occurs concerning socio-economic systems. In curbing such challenges,

transparency is important. Companies have to play a dual role in monitoring corporate behaviour and providing all stakeholders, internal and external, with the information to evaluate corporate behaviour (Nyembo & Lees, 2020). Corporate social responsibility is a good step towards improving a community's better quality of life.

Many renewable energy companies started to pay more attention to Corporate Social Responsibility (CSR). CSR has become part of the criteria for evaluating company performances. Environmental and social governance signals the socially responsible investors. Such companies with greater CSR tend to be associated with higher values. Renewable energy companies have additional incentives even if it is costly to implement CSR (Zhang et al., 2021). Large and small companies invest in corporate social responsibility to promote corporate governance to maintain competitiveness. This has been seen mostly in companies dealing with the transition to cleaner production. Companies also invest in CSR for financial and strategic reasons, such as gaining insights into new markets, novel technologies, and complementary product development support (Hegeman & Sorheim, 2021).

## 2.6 MANAGING LOCAL INVESTMENTS

Most large-scale developments have both positive and negative local effects. This is also true of the renewable energy context. Local investment in the energy sector, particularly renewable energy, plays a critical role in uplifting communities, as it deals with investing directly through economic development programmes. The renewable energy projects are highly suited to rural locations, areas that are not developed and areas with poor potential to attract inward investments. These projects come as a form of local investment and project developers need to assess chosen areas socio-economic challenges and come up with strategies to address challenges identified (Wlokas, Boyd and Andolfi, 2012).

The international experience points to a range of investments by renewable energy companies to minimise local impacts. For example, renewable energy positively impacts local economic development enabled by a healthy energy policy, and supporting guidelines that attract investments (Olleik et al., 2021). Nevertheless, barriers affect local investment in renewable energy projects in developing markets. These are technical, regulatory, commercial and institutional (Olleik et al., 2021). In Russia, policymakers and investors introduced a framework that deals with barriers to renewable energy developments. The Russian government took steps to develop support policies like a financial mechanism in promoting development and investment

in renewable energy projects (Kozlova & Collan, 2020). These renewable energy projects play an important role in local economic development and investment.

Social equity in renewable energy development projects is a necessity. In countries, such as Germany and Denmark, social equity concerns are alleviated by renewable energy's local investments, allowing individuals who could not invest alone in the renewable energy market, to do so (Cohen et al., 2021). Renewable energy projects positively impact communities in socio-economic areas, including social equity and economically. These projects have a long-term effect on surrounding communities like continuous job creation, decarbonisation, increased local economic wealth, skills and continuous development, new businesses, infrastructure and generally a positive impact. Even the research has noted the impact on local communities living close to renewable energy projects (Delicado et al., 2016). Renewable energy projects play a critical role in alleviating poverty, reducing inequality, and creating jobs in the surrounding communities. Poverty alleviation occurs through job creation, social equity and community ownership in new projects. Inequality is also reduced as many people can afford materials and properties they could not afford before project developments.

The renewable energy landscape is changing tremendously, and social justice is important as it promotes fairness to all community members. The renewable energy sector plays a critical role in low-carbon and provides socio-economic benefits, such as revitalising local economies and creating employment opportunities for local economies (Sugimoto, 2021). In Japan, renewable energy development introduced small-scale and large-scale renewable energy projects where communities play a critical role. They generate socio-economic benefits concerning new industries and job creation when installing different technologies (Nagatomo et al., 2021).

Despite many positive impacts of renewable energy, there are some negative impacts of renewable energy projects, like the high capital costs, inadequate knowledge about technology and the lack of awareness. These are the most significant obstacles, and the critical causes of failures identified in the Middle East, specifically in Iran (Oryani et al., 2021). These negative impacts hinder development as they contribute to economic and financial barriers to the success of renewable energy projects. Renewable energy projects' developments can also harm some communities. Examples include the immigration of people, which in turn can contribute to the Human Immunodeficiency Virus (HIV) and Anti Immuno Deficiency Syndrome (AIDS) and the recent global emergency virus, Corona Virus (Covid-19) (Brinkman, 2019). However, positive impacts surpassed negative impacts of renewable energy development in communities.

## 2.7 CONCLUSION

The chapter discussed what renewable energy companies do in avoiding negative local consequences internationally. The chapter looked deeply into community upliftment through renewable energy projects with a particular focus on community ownership, trusts, equity and the positive impact of contribution by the renewable energy sector at large. Renewable energy can provide cheaper energy access to poor households or other households adjusting their energy structure. Obtaining more available electricity from readily available natural resources, such as wind and solar energy, is proof that renewable energy plays a crucial role in communities. The transition from conventional energy to renewable energy is a central strategy for climate change mitigation. It has formed the robust political framework for renewable energy development by all nations under the United Nations Sustainable Development Goals 2030.

Most researchers agree on the progressive impact of developing renewable energy in different countries and the positive socio-economic and economic impact companies address. Most contribute to poverty alleviation. In some continents, especially in Europe, communities have co-ownership in large scale and small-scale projects, even poor households' quality of life changes, due to renewable energy development. Renewable energy companies added advantage in communities as the members can trade and sell in the energy sector. The sector also brings investments, strengthening ties of globalisation around the world concerning foreign direct investment, boosting economic growth and large infrastructure projects developed by renewable energy companies.

# CHAPTER 3 :
# POLICY REVIEW

## 3.1 INTRODUCTION

South Africa produces close to 85% of fuel energy from coal, and it is among the top 10 greenhouse gas emitters in the world (Mutombo & Numbi, 2019). The country depended mainly on traditional conventional energy for many decades, and this posed challenges such as poor energy security supply, unsustainability, and increased carbon emissions (Ndlovu & Inglesi-Lotz, 2020). South Africa introduced the REIPP programme in 2011. The REIPP programme started as a climate change mitigation measure to curb local negative impacts and reduce electricity shortages. Renewable energy policies and strategies introduced under REIPP, assist community socio-economic development and economic development.

The Constitution of the Republic of South Africa provides access to electricity to all citizens (South Africa, Department of Justice and Correctional Services [SA Constitution] 1996). The White Paper in Renewable Energy 2003 laid out the foundation for renewable energy. The right to benefit from renewable energy development projects is aligned with energy justice and just transition in considering negative environmental impact, community ownership, providing cheaper energy access and attracting foreign investments (Funder et al., 2021).

The country developed many different policies, strategies, accords and regulations regulating, controlling and guiding the renewable energy sector, since 2003. The assessment of all policy documents concerning renewable energy is discussed in this chapter. The chapter starts with the White Paper Renewable Energy, the National Development Plan (NDP), the Green Economy Accord, the Local Procurement Accord, the National Climate Change Response White Paper, the Integrated Energy Plan (IEP), the Integrated Resource Plan (IRP) and the Electricity Regulation Act no 4 of 2006.

## 3.2 ASSESSING THE SOUTH AFRICAN POLICY DOCUMENTS

South Africa has adopted a pro-poor policy towards energy access and affordability (Essex & de Groot, 2019). The pro-poor policy has several problems. The biggest challenge is the ageing energy infrastructure and load shedding. South Africa committed to climate change mitigation

measures through its Paris Agreement and UNFCCC (Meyer & Overen, 2021). South African policies form part of a larger renewable energy policy framework that addresses the socio-ecological, economic and educational dimensions of a transition towards renewables (Ndlovu & Inglesi-Lotz, 2020). The country is becoming a prominent reference point for developing renewable energy technologies and policies (Davies et al., 2018). These policy documents discussed below also address the local impacts of renewables.

### 3.2.1 The White Paper Renewable Energy

The White Paper on Renewable Energy 2003 serves as a basis for renewable energy technology development (Akinbami et al., 2021). It foresees 10 TWh of electricity from renewable energy (South Africa, Department of Mineral Resources and Energy [DMRE White Paper RE] 2003). Between 2003 and 2011, the White Paper focused more on rural electrification. These areas included remote schools and clinics. The rural water supply and desalination, solar home systems and solar water heaters were also developed. This includes the development of mini-grids and hybrid systems in remote areas. These were the only available renewable energy developments in South Africa before 2011. The large-scale projects started after introducing the IRP and the REIPPP programme in 2011. The main local contribution seen in the White Paper was the provision of cheaper energy, especially in rural areas.

### 3.2.2 The Green Economy Accord

The government adopted the Green Economy Accord in 2011. The Accord takes advantage of the growth opportunities offered by the technological changes required to combat climate change. One of the technical changes is the introduction of renewable energy technologies. The Green Economy Accord advocates creating many jobs and spurs industrialisation. The current government is committed to the green economy revolution. Some projects, such as solar water heaters programmes make it possible for poor households to access hot water at a low cost.

The Accord's vision is to shift the economy towards sustainable development, supporting the 400 000 green job targets mentioned on the New Growth Path and industrial development (Green Economy Accord, 2011). As the New Growth Path targets 400 000 job creations from the Green Economy Accord by 2030, these green jobs will improve the country's economy and the Gross Domestic Product (GDP). Renewable energy projects will enhance the infrastructure

development. There are many opportunities stipulated in the Green Economic Accord. Options include the manufacturing assembly of renewable energy components, the energy efficiency installation and manufacturing, the recycling opportunities and creation of small enterprises, the retrofitting of buildings with energy-efficient equipment/appliances and lastly, the biofuel and the green hydrogen sector. The Green Economy Accord directs local involvement through job creation in the renewable energy sector. There is an impact in local communities concerning their lives, and changes are evident in communities where there is a renewable energy project, mostly during construction.

### 3.2.3 The Local Procurement Accord

The Local Procurement Accord was adopted in November 2011. The support is urged in businesses to support local business procurement in the manufacturing sector. New preferential procurement regulations came into effect in December 2011, which strengthened the localisation drive in South Africa. Tenders from the REIPPP programme prescribed locally manufactured components and thresholds.

The Local Procurement Accord sets 75% of products procured and manufactured locally (Local Procurement Accord, 2011). The REIPP programme's local content rules stipulate that all independent power producers buy 60% locally manufactured components. As this is a new technology, it might not be accessible at this stage to meet the target of 60% - 75%. However, the country will see locally produced components concerning renewable energy components as time goes on.

The Local Procurement Accord should also multiply the impact of the new preferential procurement legislation framework through commitments made by businesses. Since there is an expansion of energy generation in South Africa, massive opportunities exist for local industrial development. The Accord assists in attaining the Industrial Policy Action Plan (IPAP). The local procurement also promotes job creation and industrialisation. For bid windows, one to three in the roll-out of REIPP, a target of 40% was set to be locally manufactured. The bid window four thresholds for locally manufactured components were 60% (Renewable Energy report, 2020). It has not been easy to meet the targets set out on the REIPP programme, due to South Africa's unattractive incentive package.

### 3.2.4 The Integrated Resource Plan

The Integrated Resource Plan (IRP), 2010, was first published in May 2011. It contained capacity allocations for electricity generation from renewable technologies, setting another 17,800 MW from 10 TWh established on the White Paper Renewable Energy 2003. The 17,800 MW target was selected for the energy mix by 2030 (Akinbami et al., 2021). The IRP outlines the sourcing, planning and quantities of electricity generation sources contributing to the country's generation mix. The second IRP2019, published in 2020, is characterised and developed in swift changes and more technology allocations. This document stipulates that renewable energy will increase from 11% to 41% by 2030. There are also uncertainties concerning the impact of technological transformations of future energy provision systems.

The Integrated Resource Plan (IRP), the 2010 publication, contained capacity allocations for electricity generated from renewable technologies (Integrated Resource Plan, 2010). The then Minister of Energy, Ms Dipuo Peters, issued Ministerial Determinations for renewable energy, including solar PV, solar CSP, wind, landfill gas, biogas, biomass, and small-scale hydropower. The IRP resource plan has to be reviewed every two to five years. That did not happen as the latest IRP was published in 2019, almost a decade from 2010. There is also a more prominent focus on wind energy. The plan shows a consistent annual allocation of 1,600MW of wind energy technology from 2022 until 2030 (Integrated Resource Plan, 2019). The wind energy technology is followed by solar energy technology of 1,000MW. It is stated in the IRP2019 that these allocations, in the long run, will be reviewed, taking into account demand and supply requirements. The capacity allocation of renewable energy in the IRP mitigates negative impacts concerning environmental degradation and the carbon footprint. The promulgation of the IRP spearheaded positive change in the country. There is an investment concerning foreign investors that came through and many infrastructure projects were and have still been developed, bringing billions of monies locally.

### 3.2.5 The National Climate Change Response White Paper

The National Climate Change Response White Paper presents the country's vision for an effective climate change response and a long-term transition to a climate-resilient and lower carbon economy (White Paper in Climate Change, 2012). Objectives for the White Paper is to manage climate change impacts effectively through interventions that can build the country's social, economic and ecological resilience. The goal was to make a fair contribution to the global effort

of stabilising the greenhouse gas emission in the atmosphere within a timeframe that enabled the economic, social and environmental development to proceed sustainably. The government adopted the National Climate Change Response White Paper in 2012. The response to the White paper is guided by the principles set out in the Constitution, the Bill of Rights, the National Environmental Management Act, the Millennium Declaration and the United Nations Framework Convention on Climate Change. The response paper represents the first iteration of the country's ongoing efforts to adapt to climate change and contribute to global mitigation.

The National Greenhouse Inventory conducted in 2010 recorded that approximately 80% of carbon emission originates from energy. The energy industries accounted for 63.6%, followed by the transport sector at 10.8%, and the construction and manufacturing industries accounted for 9.8%. Fossil fuel combustion, mainly $CO_2$, is one of the primary sources of greenhouse gas emissions. Renewable energy is vital in the Paris agreement. The objective of the White Paper in Climate Change is to develop mitigation measures to curb greenhouse gas emissions.

South Africa has been a signatory to the United Nations International agreement called Kyoto Protocol, since 2002. In 2009 in Copenhagen, the country announced in a Climate Change Conference that the country's carbon footprint would decline by 34% by 2020 and 43% by 2025. All these targets would be met by the IRP and the IEP, which regulates and controls the roll-out of renewable energy and energy efficiency in South Africa. Ironically the roll-out of renewable energy is triggered by the 2008 load shedding experience and the international community's pressure about climate change (Essex & de Groot, 2019).

Since the energy sector is a fundamental necessity for a country's human and socio-economic development, renewable energy development projects are important in resolving the environmental and security concerns posed by fossil fuels to humanity (Mutombo & Numbi, 2019). The carbon tax, which falls under climate change, was implemented in 2019 and was initially discussed in 2015. However, its effectiveness is questioned, due to its exceptions of up to 90% emissions by companies in specific sectors (Hanto et al., 2021). This White Paper advocates the reduction of climate change and the carbon footprint. South Africa is part of an international community where greenhouse gas emissions need to be monitored, especially in the energy sector.

### 3.2.6 The Integrated Energy Plan

The Integrated Energy Plan (IEP) guides future energy infrastructure investments and the government promulgated the plan in 2008. It identifies and recommends policy development to shape the future energy landscape of the country while looking at ways to address social growth, economic development and environmental sustainability. The IEP outlines the general energy plan for the country. This also includes a renewable energy mix. This plan is in conjunction with the IRP plan. It looks into energy security, access to energy, reducing the cost of energy supply, energy efficiency, localisation and sustainability in all energy matters (Integrated Energy Plan, 2008). The energy sector also significantly influences the sustainability and robustness of the entire economy, starting from job creation, resource efficiency, community ownership stakes, and enterprise development (Ndlovu & Inglesi-Lotz, 2020).

Integrated energy planning is required to ensure that current and future energy service needs can be met in the most cost-effective, efficient and socially beneficial manner while also considering environmental impacts. There would be severe challenges once a lack of coordinated and integrated national planning for the energy sector has led to under-investment in much-needed energy infrastructure. There are eight key planning objectives for the Integrated Energy Plan: ensure the security of supply, minimise the cost of energy, promote job creation and localisation, minimise environmental impacts, minimise water consumption, diversify supply sources, promote energy efficiency and promote energy access while addressing economic, social development and ecological sustainability. This plan advocates sustainable, cheaper energy access for local communities. It also endorses energy storage technology, which plays a critical role in renewable energy access. Renewable energy battery storage technology changed the electric power sector as it provides security of energy access.

### 3.2.7 The National Development Plan

The National Development Plan (NDP) envisages a South Africa that, by 2030, will have an adequate supply of electricity and liquid fuels to avoid disruptions to economic activity, transport and welfare. The plan acknowledges that energy prices are likely to be higher, but will still be competitive. The government adopted the NDP in 2012. It supports approximately 20 GW of energy from alternative sources, such as renewable energy by 2030 (National Development Plan, 2012). This is about 60% of South Africa’s grid capacity. The Renewable Energy Independent Power Producers Programme (REIPPP) is one of the programmes supported in the NDP. The

National Development Plan outlines the 2030 vision for South Africa's energy sector. The NDP also emphasises economic growth and development through adequate investment in energy infrastructure and quality energy services that are competitively priced, reliable and efficient. The NDP envisages that local energy technologies will support job creation, as well as assist in social equity through expanded access to energy services, affordable tariffs, well-targeted and sustainable subsidies for needy households. The NDP affirms that more than 90% of the population should have access to electricity by 2030. The NDP proposes diversity by way of alternative energy resources and energy supply options, both in power generation and the supply of liquid fuels. Access to cheaper and sustainable energy will be provided through NDP by 2030 in South Africa.

### 3.2.8 The Electricity Regulation Act no 4 of 2006

The Electricity Regulation Act, no 4 of 2006, establishes a national regulatory framework for the electricity supply industry. The National Energy Regulator (NERSA) is the custodian and enforcer of the national electricity regulatory framework, as stipulated in the Electricity Regulation Act. NERSA provides licenses and registrations in how generation, transmission and distribution, trading and the import and export of electricity are regulated. The Act provides rules for the whole value chain of the electricity sector. The objectives of the Electricity Regulation Act are to achieve an efficient and sustainable supply of electricity, protect the needs and interests of electricity consumers, facilitate access to electricity, promote the use of alternative sources, which is renewable energy, and achieve energy efficiency. The Electricity Regulation Act no 4 of 2006 provides processes for the whole electricity value chain and the determination for new generation capacity, which is in line with the provision of clean energy access. The social license to operate is also given to project owners by community members through public consultation, which the Electricity Regulation Act promotes.

***Table 3.1: Policy/Strategy comparative***

| Policy/ Strategy | Year | Characteristic | Local implications |
|---|---|---|---|
| White Paper in Renewable Energy | 2003 | The first policy/strategy about Renewable Energy in South Africa. It detailed how the country will generate 10 TWh of electricity from renewable energy resources. The policy document served as a basis for renewable energy technologies developed in South Africa. | Using hybrid systems and mini-grid technology services, the White Paper on renewable energy provided cheaper energy access in poor households. Bio digesters and solar energy were mostly developed. |
| The Green Economy Accord | 2011 | It is from the New Growth Path, Accord number 4. The Accord targets 400 000 jobs to be from green industries. The target is manufacturing renewable energy components, energy efficiency, and recycling. | Local impact in communities through job creation where there is a REIPP programme. Community's lives are changed through this strategic Green Economy Accord. |
| The Local Procurement Accord | 2011 | It is from the New Growth Path, Accord number 3. The Accord sets out 75% of renewable energy products to be locally procured. On the REIPP programme, there is a threshold of 60% to be procured locally. | Industrialisation creates local jobs. Locals are involved when manufacturing renewable energy components and appliances. The local and district municipalities' local economy is impacted positively. |
| The Integrated Resource Plan | 2011 | This plan outlines the energy mix's planning, sourcing, and quantities of electricity generation sources. | The capacity allocation of renewable energy in the IRP mitigates negative impacts concerning carbon footprint reduction. Many foreigners invested through infrastructure projects. |
| The National Climate Change Response White Paper | 2012 | This White Paper stipulates that the energy sector is the most dominant in releasing carbon emissions, followed by the transport sector. Mitigation and adaptation in the energy sector | This White Paper advocates the reduction of climate change and the carbon footprint. |

| | | | |
|---|---|---|---|
| | | include the development of renewable energy. | |
| The Integrated Energy Plan | 2008 | This plan looks into energy security and energy access in South Africa. The plan is in conjunction with the IRP. | The provision of sustainable, cheaper energy access is advocated through this plan. It also endorses energy storage technology, as energy plays a critical role in renewable energy access. |
| The National Development Plan | 2012 | This plan outlines the 2030 vision for South Africa's energy sector. It also supports the 20 GW of renewable energy by 2030. It also affirms that more than 90% of the population in South Africa will have access to electricity. | Access to cheaper and sustainable energy will be provided through NDP by 2030 in South Africa. 90% of the population will have access to clean electricity. |
| The Electricity Regulation Act no 4 of 2006 | 2006 | This Act stipulates the Ministerial Determination in Section 46, that through consultation, the Minister can determine types of energy sources to be procured and who to procure the energy. | The Electricity Regulation Act, no 4 of 2006 determination for the new generation, aligns with clean energy access. The social license to operate is also given to project owners by community members through public consultation. |

### 3.3 REIPPP IN SOUTH AFRICA

The REIPP programme was launched in 2011 at COP17 in Durban. Although many of the policies above referred to local benefits, REIPPP specifically focused on the socio-economic environment of projects. REIPPP follows a competitive tender process that secures investment into grid-connected renewable energy (Akinbami et al., 2021; Mutombo & Numbi, 2019). It has three main themes: reducing carbon footprint $CO_2$ emissions, finding avenues for economic development, and improving capacity. REIPPP has to reduce South Africa's greenhouse gas emissions and address concerns over the present dependence on nuclear and coal-powered electricity. The programme procurement framework includes expenditure targets to drive Socio-Economic Development (SED) and Economic Development (ED) in local communities.

### 3.3.1 Socio-economic development through renewable energy

The socio-economic development through renewable energy in South Africa takes place mostly in rural areas. Rural economies benefit from programmes promoting social and economic development through Foreign Direct Investment (FDI) (Lombard & Ferreira, 2015).

#### *3.3.1.1 Socio-Economic Development guidelines*

The socio-economic development objectives with renewable energy procurement are achieved through a two-fold process. First, companies must demonstrate how they will meet the socio-economic development elements outlined in a specific scorecard, weighed at 30 out of 100 points. Second, price determines the remaining 70 points (Davies et al., 2018). The table below shows the guidelines for the 30 points and 70 points.

***Table 3.2: 30 points guidelines***

| **Economic Developments Elements** | **Weighting** |
|---|---|
| Job creation | 25% |
| Local content | 25% |
| Ownership | 15% |
| Management control | 5% |
| Preferential procurement | 10% |
| Economic development | 5% |
| Socio-economic development | 15% |
| **Total** | **100%** |
| **Total points** | **30 points** |

*(Source: SAPVIA & SAWEA, 2021)*

The remaining 70 points are for the price. The REIPP is allowed to deviate from the 90:10 system and also allowed for the exemption from some sections of the Broad-Based Black Economic Empowerment Act codes of good practice.

#### *3.3.1.2 Challenges in implementing socio-economic development*

Despite good policies and strategies addressing socio-economic development and community trust of renewable energy development projects, the sector still has problems with the disposal of photovoltaic solar panels plans' waste management. The waste from the panels poses a threat to the environment as they contain hazardous substances. The country has not developed a policy that will focus on hazardous waste substances from the REIPP programme or any renewable energy project. This poses a challenge as there are many projects developed already.

The panels depreciate over time, and in 20 years, panels no longer produce energy efficiently. There is no plan in South Africa for decommissioning. More research on the South African context, climatic conditions and the right panels for use in some areas, is urgently needed.

Another challenge is that municipalities in South Africa are not favourably positioned to engage with REIPPP, concerning the strategic plans. Insufficient capabilities of engaging with international renewable energy developers are some of the challenges encountered by REIPPP companies in building socio-economic development capability objectives (Davies et al., 2018). Coordination between companies applying REIPPP and local and provincial governments is unstructured. There is a lack of integration. REIPPP companies report directly to the national government and are not required to demonstrate alignment with the local development planning process. In most cases, the local Economic Development Plans and Integrated Development Plans omit REIPP (Davies et al., 2018). These challenges affect the socio-economic development element of implementation.

Some of the challenges associated with socio-economic development in renewable energy implementation, are the lack of sufficient guidance for independent power producers on community benefit. This includes the engagement details on the socio-economic development strategy, how far to engage, and with which stakeholders. Second, the strategy uses an overly simplistic definition of beneficiaries. In some areas, beneficiary areas overlap. Last, the roles of different local stakeholders, such as municipalities, have very little indication (Tait et al., 2013). The Integrated Development Planning (IDP) and participatory approach to develop community engagement is not in collaboration with local municipalities. This poses challenges as the programme implements initiatives that are not in line with the municipalities where they are situated.

### 3.3.2 Economic development through renewable energy

Renewable energy projects in South Africa emphasises sustainable rural development, local economic development and small-town regeneration (Davies et al., 2021). The geography of the REIPPP programme is predominantly located in rural areas and small rural towns (Mutombo & Numbi, 2019).

The renewable energy sector can be one of the biggest contributors of Growth Development Product (GDP) and plays a critical role in uplifting the country's GDP. However, the renewable energy sector currently does not appear to have a stand-alone impact on the GDP. This does not mean that renewable energy is not a promising sector option for the future. It simply means that the share for renewable energy and Research & Development (R&D) are historically lower to make any significant impact on the GDP (Ndlovu & Inglesi-Lotz, 2020). In 2020, the renewable electricity generation investment was $303.5 billion, compared to $297.6 billion in 2019 and $45.2 billion in 2004. Such achievement is awe-inspiring, with direct and indirect economic benefits (Osiolo, 2021).

The REIPP programme requires all renewable energy companies to contribute to various economic development initiatives, and this also includes the local communities where the projects are located. The economic development criteria in the REIPP programme in local communities include job creation, community ownership, socio-economic development and community ownership (Tait et al., 2013). The socio-economic development criterion requires that every developer make a financial contribution of approximately 1 per cent and 1.5 per cent of total project revenue to communities, situated at a 50-kilometre radius. The financial contribution to community members can include education, health, arts and sports and service delivery programmes.

Communities living close to renewable energy projects will benefit from the projects for the next 20 years. The wind and solar association (SAPVIA, 2021) and (SAWEA, 2021) embrace voluntary responses for renewable energy companies. The projects contribute to poverty alleviation through job creation, especially during construction. Inequality is also reduced in a community since each project invests funds into socio-economic development initiatives and enterprise development programmes. The companies choose which area to invest in in the local community and sign a national government contract.

When developing new projects, energy companies need to address local community needs (Agudelo et al., 2020). There are three requirements to be implemented by each company in

South Africa. Typically, each renewable energy project could be solar/wind, and biomass is obliged to engage with local communities on development within the 50km radius around the project site. The policy requires each company to invest 1-1.5% of its project revenue into socio-economic development programmes (SAWEA, 2021). Companies can also invest up to 0.7% of the projected revenue into supporting enterprise development measures. Third, the company have local community ownership shares. This shareholding is fulfilled mainly by allocating shares to a community trust, representing residents (SAPVIA, 2021).

The local municipalities are key stakeholders in the implementation of renewable energy projects. They keep the database for all small-medium enterprises in their jurisdiction. This information sits with local economic development practitioners. However, problems encountered in these renewable energy projects is that roles to be played by municipalities are not clear or even how they should be included in all programmes (Tait et al., 2013). Even though there is a 30% in local procurement accord that procurement of goods should be local, local procurement applies to any business located nationally in South Africa in these renewable energy projects. The majority of entrepreneurs within the 50-kilometre radius does not benefit. Enterprise development is critical in municipal IDP and Local Economic Development (LED) strategies (Davies et al., 2018). The challenge of intergrading and coordinating by including all stakeholders on the implementation and development of renewable energy projects, is critical and currently, it is a huge task.

### 3.3.3 Employment

By doubling the renewable energy global share mix by 2030, the global GDP would be increased by 1.1%, which is approximately USD 1.3 trillion. The renewable energy sector needs a comprehensive plan for job creation concerning job transfers and the restructuring and support mechanisms are essential (Hanto et al., 2021). Most REIPP project companies employ Economic Development Managers to interface with community members; these positions are complex. They have to address community issues and have company interests in their dealings (Funder et al., 2021).

There is also a job creation requirement through local employment and local community shareholding (Davies et al., 2018). Bid windows 1 to 4 created 36 749 jobs in the Northern Cape, of which 35 363 were RSA Citizen jobs. The main issue about job creation in renewable energy projects is that job creation is not sustainable compared to coal-fired power stations, as

most jobs are during the construction phase. The maintenance and operation phase has lower levels of job creation. There could be some challenges in the transitioning process.

Energy policies must also address employment, equity and social justice (Hanto et al., 2021). The local government must play a key role that emphasises the critical roles when developing strategies, such as IDP and LED to meet local needs and promote communities' social and economic development in specifically defined territories, especially job creation. The local government must play a central role in representing communities, meeting their basic needs and protecting their human rights. The focus must be on the resources and efforts in improving the quality of life of communities, especially members that are marginalised or excluded, such as disabled people, women and impoverished people. There are four characteristics of developmental local government: integrating and coordinating, maximising social development and economic growth, leading and learning, and democratising development. These are critical in local projects of renewable energy developments.

Capacity building and skills transfer in local communities is evident in the REIPP programme as this is a new technology, and local communities are employed. Skills transfer and capacity building happen in local communities. Since most of these projects are in the poor rural outskirts, they uplift communities. Youth awareness about the new sector, which is renewable energy, is involved. Renewable energy companies introduced career guidance in the renewable energy sector or green economy.

### 3.3.4 Ownership

Globally, renewable energy ownership, regulation, and governance are debatable, especially for those advocating for state-owned monopoly and market liberation. The utility-scale REIPP allows for the natural ability of the projects to facilitate low carbon transition and market liberation. This is not the case, as public ownership of renewable energy projects allows general planning and democratic control (Tait et al., 2013).

The utility-scale renewable energy and regulatory framework in Germany were introduced in the 1990s. There was a vital role of community ownership, which prioritised decentralised renewable energy systems. The South African design on a utility-scale and framework, two decades later, project financial actors and corporates also own the projects. Wealthy consumers install small scale projects; this happened in the absence of legislation in South Africa (Funder et al, 2021).

In the Constitution, Section 152, the local government's objectives should focus more on employment and ownership, especially in these new projects, to improve the local economy. The municipality must be aligned and complimented with development plans and strategies to give effect to principles of cooperative governance as per the Constitution. Cities to participate in national and provincial development programmes have been clear that municipalities are not participating in the REIPP programme. This is where renewable energy projects come in at a local level; they must be included in Local Economic Development (LED) strategies and Integrated Development Plans (IDP).

According to the (GCIS 2018) report, South Africans own the majority share of 57.8%, R11.90 billion in REIPP project companies. Out of the 57.8% South African shareholding, an average of 64.2%, R7.64 billion, is held by black shareholders. The balance of the shareholding is mostly with institutional investors such as Old mutual, Public Investment Corporation (PIC), and state-owned companies such as Industrial Development Corporation (IDC). The programme has also committed to employing 86% of black South Africans in top management positions. Community trusts, shareholding, and equity in the REIPP programme play a critical role for all members benefiting from the project.

Community ownership in community trusts, equity, and shareholding promote local renewable energy development. Community members are involved and this is critical in the success of the REIPP programme when community members actively participate. Under the REIPP programme, there is a percentage share for community members in the vicinity for every project. Social licence to operate from community members to REIPPP companies is another positive step in accepting the project. Also, the corporate social responsibility from renewable energy companies assists in uplifting some poor households and families since some companies implement CSR in bursary schemes and other things, in uplifting communities.

## 3.4 CONCLUSION

Legislative framework, policies and strategies are of paramount importance in any nation, since targets set up on policies need to be met as stipulated. It has been evident that a REIPPP is critical in South Africa. A sustainable and environmentally friendly rural electrification scheme is also significant in achieving the SDGs by 2030. Goal number 7 on the SDG emphasises affordable and clean energy, aligning with the National Development Plan, 2030 (Meyer & Overen, 2021). The SDG goals are not legally binding; however, many developed and developing countries follow

the directive by adopting renewable energy development grid-based and off-grid projects to improve socio-economic development and economic development (Meyer & Overen, 2021). South African policies in the renewable energy sector are the best policies globally, especially the IRP and the REIPPP programme.

All renewable energy policies developed in South Africa address issues, such as climate change, cheaper energy access, community ownership, a social license to operate and all other negative impacts. The SED and ED included in the REIPP programme framework, drive change in local communities, since there are also requirements related to job creation through local employment and community shareholding (Davies et al., 2018). The REIPP programme includes all integrated programmes needed for a programme, which provides for the community, private companies and state-owned entities. The Power Purchase Agreements (PPA) are given to winners of the REIPP to increase renewable energy system capacity into the grid (Hanto et al., 2021). The programme is further designed to decarbonise the country's reliance on coal-fired stations, contribute to environmentally sustainable socio-economic development, and stimulate the indigenous renewable energy industry (Davies et al., 2021).

The local negative impact is mitigated like poverty and unemployment, since these projects bring relief to communities concerning economic development. In line with international experience, all projects required the development of community trusts and it has been created. South Africa has a high unemployment rate of 34% and it remains a crucial challenge (INSPIRE, 2021). However, there is hope for change with these renewable energy project developments in rural areas. These REIPP projects form a socio-technical infrastructure and new material imaginaries at a local level (Davies et al., 2018). Policies created in South Africa addressed the socio-economic aspect in the rural outskirts where these projects are situated.

# CHAPTER 4 :
# DATA ANALYSIS

## 4.1 INTRODUCTION

Chapter 2 indicated how international renewable energy companies contribute to local communities' socio-economic development and economic growth. Local benefits ensure the legitimacy of these projects. Chapter 3 discussed the renewable energy policy in South Africa and guidelines to ensure socio-economic development. This local emphasis on socio-economic development must ensure the local acceptability of projects. Chapter 3 emphasised the significant changes from the White Paper in Renewable Energy in 2003, until the roll-out of the REIPP programme in 2011.

This chapter analyses the responses from interviews and focus groups in the Dawid Kruiper Local Municipality (DKLM) and Khai Garib Local Municipality (KGLM). Although the focus is on the ED and SED programmes, the analysis also includes broader issues, as discussed in Chapter 2. I was interested in how local communities benefit (and their perception about benefit) or not from renewable energy programmes. Such benefits should help to ensure the local acceptability of energy projects. Thematic analysis was used to analyse the data.

## 4.2 RENEWABLE ENERGY PROJECTS

There are four renewable energy projects in DKLM. The four renewable energy projects within a 50-kilometre radius are: Scatec Solar Sirius, Dyason's Klip 1 and 2, Xina Solar One- Abengoa, Khi Solar One-Abengoa, and Ilanga-Karoeshoek solar projects. Table 4.1 provides the investment values as follows:

***Table 4.1: Investment and nominal value for solar farms in Upington***

| **Solar Farm** | Scatec Sirius, Dyason's Klip 1 & 2 | Xina Solar One Abengoa | Ilanga-Karoshoek | Khi Solar |
|---|---|---|---|---|
| **Technology** | Photovoltaic | Power Tower-CSP | Parabolic Trough-CSP | Power Tower-CSP |
| **Nominal capacity** | 258 MW | 100 MW | 100 MW | 100 MW |
| **Investment value** | R4,8 billion | R11,7 billion | R6,5 billion | R14,9 billion |
| **Start year** | 2016, 2018, 2020 | 2016 | 2018 | 2016 |

*(Source: Own compilation)*

Table 4.1 shows renewable energy projects around DKLM. Construction for renewable energy projects started in 2014 and they were connected to the grid in 2016. The total investment value invested in the projects so far, is R37.9 billion. The nominal capacity is 558 MW and the project use concentrated on solar power and photovoltaic technologies. This is an important step to show that South Africa is serious about meeting the Paris agreement and is on the right track to meeting the UN 2030 SDG goals of providing clean and affordable energy.

## 4.3 CONCEPTUAL FRAMEWORK

Chapter 2 provided an international literature overview on renewable energy companies about socio-economic development in communities. Chapter 3 focused on the renewable energy policy in South Africa, with a special focus on the REIPPP programme. The REIPPP programme criteria focus on socio-economic and enterprise development and job creation within a 50-kilometre radius. This chapter focuses on data analysis on the socio-economic development of local communities near renewable energy projects. The data identified the following themes: cheaper energy and load shedding, job creation, community empowerment and development, adaptation and mitigation to climate change and community trust. Therefore, the thematic data analysis of interviews considered the themes described below (see Figure 4.1).

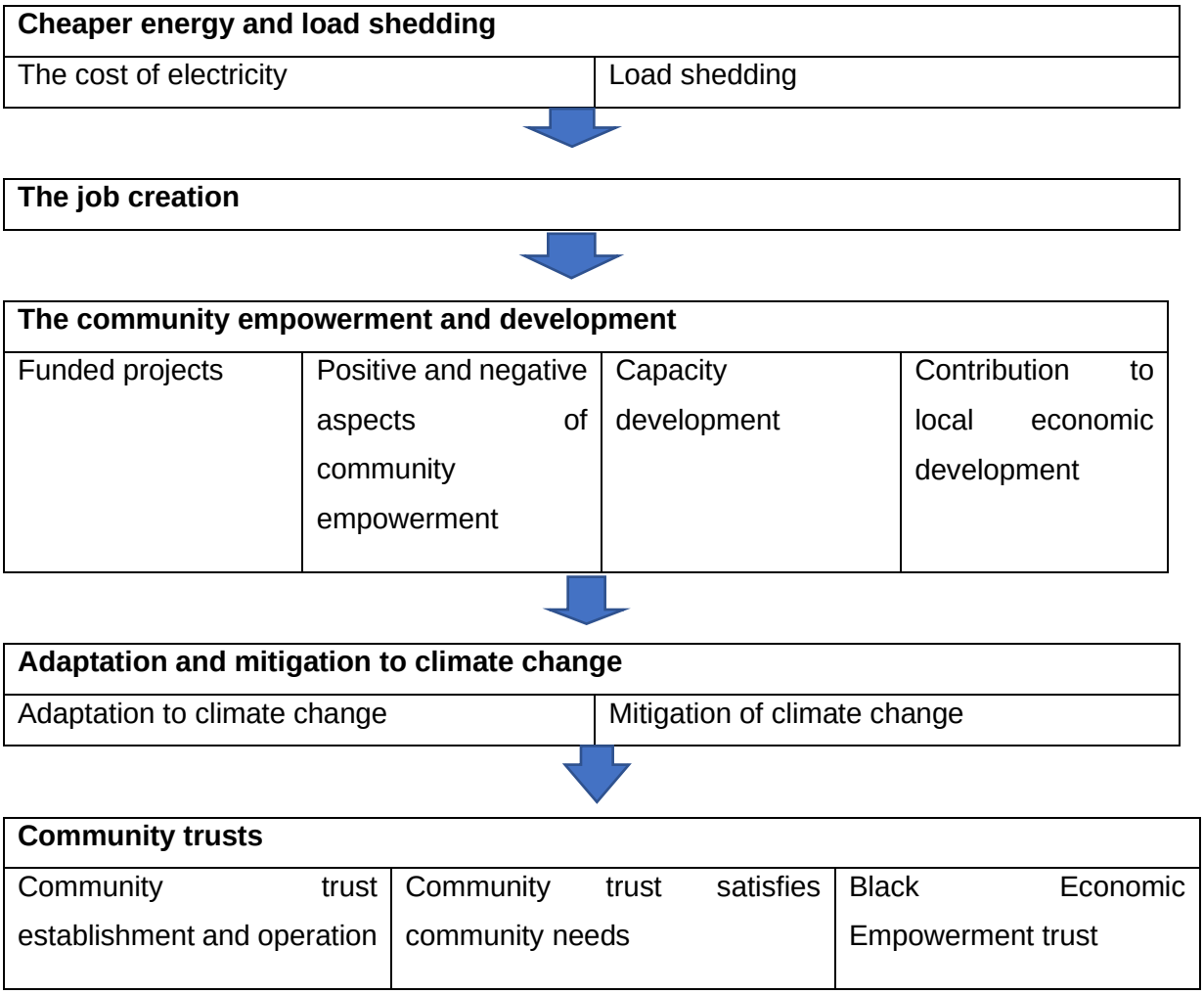


***Figure 4.1: Summary outlining research finding themes***

## 4.4 CHEAPER ENERGY AND LOAD SHEDDING

Renewable energy is generally cheaper than conventional coal, creates jobs and can play a role in uplifting communities (see Chapter 2). Cheaper energy can lead to socio-economic well-being. I outlined policy approaches to reach these objectives in Chapter 3. One way of creating local acceptability is by providing cheaper electricity to the local people and fostering other development opportunities. Energy costs in South Africa are high and have experienced a rapid increase over the last 15 years. The responses from the interviews show that lower energy costs were an expectation in Upington. It was a concern that electricity remains expensive even though the respondents stay next to solar farms.

### 4.4.1 The cost of electricity

Affordable and clean energy is a SDG. The SDGs state that by 2030 everyone must have access to clean and affordable energy. However, electricity hikes hamper achieving this goal. The grid-connected electricity in South Africa is expensive, because the Energy Regulator of South Africa (NERSA, 2022) approves Eskom tariffs centrally. Over the last ten years, electricity prices have increased by 356% compared to inflation over the same period of 74% (SA Government News Agency, 2022). Consequently, South Africa has high electricity costs, which are also applicable to communities near renewable plants. Many interviewed respondents were alarmed by this reality and assumed that having the solar plants nearby would decrease electricity costs. One respondent said:

> *"I assumed this tower would generate electricity for Upington, do you see? But later, one understood that the grid goes from Johannesburg to the main power station. At this stage, it isn't good that it is done here, but we at the bottom are not benefitting. We thought the electricity that you buy from ESKOM would be cheaper. I am now buying electricity for R2 000 and then getting 840 units"(interview 1).*

There was an expectation of cheaper electricity, because of the proximity to the power plant. However, this expectation did not materialise. Reference to "this tower" shows that the respondent is unhappy, because there is no local benefit regarding electricity prices. The electricity from solar plants goes into the national grid, leaving local community members with expensive electricity costs. People elsewhere do not have a tower in their proximity, but receive clean energy. The absence of cheap electricity also hampers possible economic development and negatively affects the ability to achieve the SDGs. This reality is even more difficult for low-income households who spend a large proportion of their income on energy. The high energy costs negatively impact consumer spending and hamper economic development possibilities. Moreover, the lack of local benefits might also hamper the acceptability of these plants.

### 4.4.2 Load shedding

South Africa has been facing load shedding since 2008. Load shedding contradicts the right to energy in the constitution (Hanto et al., 2021). Load shedding has many socio-economic consequences affecting water supply and telecommunication. It disrupts the routine of households and businesses. Even though solar energy is generated near Upington, the area does

not escape load shedding. In dismay, the respondents often said that "*load shedding is still like it was*" and is "*a pain in the neck*" *(interview 2*). The following quotes summarise the situation:

> *"We thought that because this tower is close to us and Pofadder's generation system, we won't need to have load shedding, because it is right here. But then we heard ESKOM says it is unfair. They can't give us continuous power, because the towers are here and other places are sitting without power" (interview 2).*

The quotes show that the expectation that renewable energy would minimise local load shedding did not materialise. The residents were of the view that having a renewable energy plant "right here" (nearby), results in the absence of load shedding. The first quote also points to the inconveniences created by load shedding. The second quote mentions that they thought they would not have to deal with load shedding, "because the towers are here". Instead, they need to accept the towers and load shedding.

### 4.5 JOB CREATION

Local employment can also ensure local acceptability (see Chapter 2). In Chapter 3, I highlighted government expectations about renewable projects creating jobs. Because of the large role of construction, many jobs are only part-time. After construction, the projects only require a few people for operations, cleaners and management. The community of Upington expected that renewable energy projects would address the challenge of unemployment and poverty. The responses show that communities were promised long-term jobs and some resentment about the short-term nature of employment. The following two quotes express the situation regarding jobs:

> *"When they were busy working, almost 2000 people were working there, but presently there aren't as many people. The maximum number of people working there is 30, 40, let us say 50 people work there" (interview 1).*

> *"It was stated at the council meetings how many job opportunities there will be. The people were not involved with anything else. They just told them how many job opportunities there were and how many people would get jobs. Yes, it was said that many people will get jobs" (interview 2).*

The first respondent compares job creation during and after construction. The second respondent refers to the difference between what was promised and what occurred in practice. The perception created around long-term employment did not materialise. Statistics showed that out of the

economically active population in 2019, there were 12 800 unemployed people or an unemployment rate of 28.6%. There is no evidence in the official statistics that the renewable energy projects dent the unemployment rate as employment only booms during construction, and community and government expectations are not met.

## 4.6 COMMUNITY EMPOWERMENT AND DEVELOPMENT

The REIPP programme requires renewable energy companies to contribute to various socio-economic and enterprise development initiatives (see Chapter 3). These initiatives total 30% of the bidding structure. The inherent assumption in the bidding process is that impoverished communities living near these renewable plants, should benefit (Tait et al., 2013). The community benefits in the form of development and empowerment. The renewable energy companies initiate and fund projects for community empowerment and development in meeting the socio-economic development criteria of the REIPP programme.

### 4.6.1 Funded projects

There is evidence of socio-economic and enterprise development in the DKLM jurisdiction, where Upington town lies. These companies invested in many programmes by funding projects that contribute to various economic and socio-economic development in local communities, as required by the REIPP programme (Renewable Energy Report, 2022). The programmes initiated by the renewable energy companies include:

- **Foetal Alcohol Spectrum Disorder**

In addressing the Foetal Alcohol Spectrum Disorder (FASD), renewable energy companies in conjunction with the Foundation for Alcohol Related Research (FARR), work together to improve the well-being and educational outcomes for pregnant women in the region. FASD rates are very high in the Northern Cape Province. There are high levels of malnutrition, which have the potential to negatively impact health, children's growth and the children's cognitive development capabilities. Awareness is raised in local communities on the dangers of alcohol during pregnancy. Psychosocial support and medical support are given to pregnant women. This programme's impact is awareness and increased knowledge, improved child health and maternal understanding of alcohol abuse and its negative impacts.

- **Dream-fields project**

Renewable energy companies implement the Dream-fields project to address the socio-economic challenge in the region. The project focuses on investing in sustainable netball and football in rural communities and township schools of Upington. Sustainable communities are built by introducing sports in primary schools and the educational environment. Youth development is empowered by integrating recreation and youth in equipment and improved facilities, including capacity building and training for administrators and coaches. This is done by building links between community clubs and school sports. This extends the programme's benefits to young adults.

- **Self-empowerment and development for youth through art and culture programmes**

Renewable energy companies create opportunities in the art and culture sector for the self-empowerment and development of young South African through music, dance participation and active citizenship. The programme aims to build and empower young people and capacitate community members and staff, training the youth to contribute to a vibrant society. The programme is partnered with the Field Band Foundation. The programme focuses on primary and high school learners. In this programme, young tutors who are former band members teach young peers and project officers to liaise with teachers, parents, and other stakeholders to manage the project in the community.

- **The public sector/ Department of Health and Education infrastructure upgrades**

Given their rural nature and vastness, schools and hospitals in the Northern Cape face the challenge of infrastructure backlogs. Most hospitals and schools do not meet the minimum requirements for hygiene, sanitation, safety and security measures and therefore, upgrades are critical for a better quality of life for the society at large. The programme of infrastructure upgrades ensures an enabling environment for learners and community members for marginalised and deprived learners and community members in identified areas by renewable energy companies. Adequate hygiene and sanitation, including appropriate washbasins and toilets, are critical for community members, especially now that there is a Covid-19 pandemic globally. This is an ongoing programme run by renewable energy companies in Upington.

- **Community development workers programme, computer laboratory training centre and entrepreneurship training for community members to start their businesses**

The Community Development Workers (CDW) programme by renewable energy companies, aims to fill the social gap identified by community leaders and society in Upington. It is formed from public servants who disseminate information and services to communities, they focus on services and benefits to which all citizens are entitled to have. They form relationships with the poor and needy people in a community. Needy people and community members turn to Community Development Workers through the relationship formed. Basically daily, community members turn to CDW with numerous social problems, including drug use by teenagers, crime in the area, domestic violence, and gender-based violence.

- **Health services to the community include oral/dental care and eye tests for school children.**

The health services programme, by renewable energy companies, aims to fill the socio-economic gap by focusing on school children, pensioners and community members at large. Trains and buses are used where community members are given free health services, targeting areas far from the service points. Doctors, even as far as Johannesburg, travel to Upington and work on these buses and trains for a specific period. The local nurses and community caregivers assist them. This programme invests in the community's overall health, since scheduling comprehensive dental and eye exams is very important, and school children in rural areas are taught this importance early.

- **Community computer laboratory**

A computer laboratory has been installed in Paballelo, Upington, for the community training centre. The centre is easily accessible to all community members in that particular location. There are ten laboratory stations with the latest software and information technology. This project addresses the needs of community members, since the Wi-Fi network is a challenge for school children and small businesses. This programme addresses entrepreneurship development, basic computer training, basic website design and basic project management. Information technology is a necessity for all community members.

- **Enterprise development for community members**

Business start-ups' high failure rate has been the biggest challenge in South Africa. This is attributed to inadequate business knowledge, lack of mentorship and incorrect candidates

awarded enterprise opportunities. Failure usually comes up after one or two years. Renewable energy companies trained small business enterprise owners to understand enterprise development. Financial management and adequate skills are other entrepreneurial challenges. Overall, entrepreneurship skill is lacking. By training entrepreneurs in Upington, the companies hope to create economic growth. Entrepreneurs received training from Stellenbosch University and the University of Free State.

### 4.6.2 Multiple sector projects initiated by renewable energy companies

The renewable energy companies identify socio-economic challenges in a 50-kilometre area and address the challenge as per the requirement of the REIPP programme. Multiple sector projects done are then reported to the IPP office quarterly. The respondent indicates some of the projects initiated by renewable energy companies.

> "*At least there are some projects they have done, so they have done social infrastructure projects. They have improved school infrastructure and bought school uniforms. So there have been some immediate benefits that have flown. The impact of these still has to be seen" (interview 23).*

The respondent explains the projects undertaken by renewable energy companies in Upington. These projects address the community development measures and align with the community's socio-economic development - educational outcomes for the community of Upington due to improved infrastructure and well-being. The school uniform boosts children's morale and they will perform better since they are not different from other learners.

Some renewable energy companies have a long-term strategy with different sectors where they have identified needs to be addressed in 20 years. The respondent indicates some of the projects initiated by renewable energy companies.

> *"So, we focus on the 20-year strategy imperatives, which is now the health and wellness of the community, the local economy, which is enterprise development orientated and local skills development and education and then we implemented projects for the different sectors or focal areas, where we looked at healthcare and MOU with the Department of Health and intervened in areas like Louisville and Keimoes to help with the school health and the dental and oral care side. Because the Department of Health can't deliver those services to the poor, you'd find areas like Kalksloot where you have 3000 people. Those*

*people are far from the service points, Upington or either Keimoes. … all those areas, ja. Yes, which is now the farming communities or living in the vineyards, like Kanoneiland, Straussburg. We've been servicing those areas by helping the Department of Health render health services, dental, and eye care for school kids. Because we see that there is a link between education and health" (interview 11).*

The second quote indicates that the organisation he works at, focuses on a 20-year strategy. The strategy will deliver on the health and wellness of the community, skills development and enterprise development. There is evidence that companies address the community's basic needs. Seemingly, this is done by improving the health of all community members and through organised and sustained community efforts. Dental and eye care will assist learners in having better education outcomes and performance in their studies. When it comes to enterprise development, the renewable energy companies invest their capital and time and assist community members in expanding, establishing and improving their businesses. The entrepreneurs are empowered to support their families by running successful businesses. The entrepreneurship programme is critical as it is accountable for shaping the region's economy. The skills development programme focuses on the working-age community members who are given access to knowledge and a good working attitude to improve their CVs.

### 4.6.3 Long-lasting community impact projects

Community empowerment is a continuous action by renewable energy companies and respondents indicated that renewable energy companies undertake many positive initiatives that have a good long-lasting impact on the community. The following comments point to the social value of these programmes;

*"They had a lot of social responsibilities. They would sponsor a school, bus, fix gardens, or a rugby field. There were many things like that. They spent a lot of money on things like that. I don't know all the details, but there were many projects. I know about the baby house in Upington, which they sponsored. They had many projects" (Interview 15).*

The community benefits from renewable energy companies through many social responsibility projects. The programmes allow community members to access important opportunities they could not access should renewable energy companies not have been there. Improved education through initiatives, such as school buses and human development seems to be key to the

approach. This is generally an appropriate approach as it builds the capabilities of the next generation and has a long-lasting impact on the community.

The respondent explains the contribution of renewable energy companies to evening classes. This is another empowerment for the community.

> *"Yes, they did contribute to education, but the plan was not followed carefully, because they arranged evening classes for the children. The company would also pay for municipal transport services" (Raaswater 2: Interviewee 5).*

The community member points out that the companies empower the children with evening school classes. However, the school approach has received negative comments, because the quote refers to "the plan not followed carefully", which means the Department of Education encountered challenges in properly implementing the evening classes for school children. These programmes must be collaborated properly by all stakeholders. The planning stage is critical. Although capacity building is often not visible action, one should acknowledge the community's response around a problematic and unconvincing plan. The respondent also mentions that renewable energy companies pay the municipality transport costs for evening classes. This is another positive initiative as some municipal employees gain knowledge by attending evening classes.

### 4.6.4 Community needs to be addressed by renewable energy companies

Some of the needs not addressed by renewable energy companies, were mentioned when community members raised important issues that need to be looked at by the companies. There is a need to conduct a traditional approach which focuses on community needs, deficiencies and problems in society nearby. This approach is also referred to as the needs-based approach. Supply and demand are identified when following the traditional approach. Respondents below mention the needs they wish to be addressed by renewable energy companies in their community.

> *"I would be very happy if the solar panels can help us. We have a crèche at one part of the neighbourhood, but the neighbourhood expanded and now we need another one on this side of the neighbourhood. These children's parents work the most and there is not anyone to take care of them because it's too much for the parents. If there is a crèche close by, it will be easier for the parents or relatives to take the child to school" (Raaswater 1: interviewee 6).*

*"I would ask. We have been living in a squatter camp for six years now. There's no water. There's water in tanks, but these tanks do not even have lids. I am so sure that water is not healthy. Our naughty children could throw poison in there. I am not happy with the water there anymore. And there are no toilets. No toilets in all the years we have been living there. I would be very happy if they could come here and look at our communities and ask us what our greatest need is, which they can help us with. The community, not the municipality. The municipality does not always know what we need most" (Raaswater 1: interviewee 6).*

The quotes above indicate that the communities lack important needs like the crèche, since children's parents work on a nearby solar farm. The parents struggle with people who will be taking care of their children when they are at work. This means that children's developmental foundation and future learning are not built when they do not have a crèche nearby. A crèche plays a crucial role in children's development. Renewable energy companies must take over the community's needs and align their programmes and initiatives with communities' expectations, especially when employing parents. They also need to take care of children. This is an issue as there is no collaborative planning. There is a disconnection between renewable energy companies and local governments. Instead, companies report directly to the national government with some projects that are not aligned with what is needed locally.

The second quote indicates the water and sanitation issue. Water is a necessity and one of the basic rights of all citizens. They all need to have access to clean water. Water and sanitation are the biggest challenges in South Africa. More than 3 million people lack access to clean water and only 82% have access to improved sanitation (Stats SA, 2022). Access to clean water and sanitation is scarce in rural areas. Waterborne illness is a threat and rural areas suffer the greatest lack of water and sanitation. This means that the community is linked to the transmission of diseases, due to inappropriately and inadequately managed water and sanitation services, which expose individuals to preventable health risks.

### 4.6.5 Change in quality of life

As mentioned, renewable energy projects are responsible for implementing socio-economic development programmes. Many small programmes are trying to change the quality of life for people staying in Upington. These programs and initiatives focus on community development by

implementing socio-economic initiatives targeting schools, hospitals, and the community. Respondents mention some initiatives undertaken by renewable energy companies.

> *"At this stage… Our projects get broken up, and CSP projects get broken up. The first one is nutritional support to the community. The second one is educational support, of which we help the whole school in the area in one way or another. The other one is your health industry. We try to help the isolated towns with medical services, especially the agricultural areas. We don't give it to them, but we help them with it. We pay for costs associated with that" (interview 3).*

The respondent describes their engagement in different projects to address the community development issue. The respondent also mentions that the projects are divided into sectors identified as critical community needs. This means that the renewable energy companies positively changed communities since some cross-cutting issues like illiteracy that are addressed. Upington is alleviated in many ways: children manage to get food in schools, yet some usually drop out of school due to challenges of hunger and they cannot concentrate. The community changes economically and socially by having literate people and reducing sick community members. Community members and many children will no longer go through socio-economic challenges as they used to, prior project development and implementation. This leads to an improved quality of life in a community. High levels of malnutrition negatively impact health, children's growth, and cognitive development capabilities. Implementing nutritional and educational support for the community impacts the increased knowledge, improved health, and maternal well-being.

### 4.6.6 Capacity development

The renewable energy sector is a new industry in South Africa, and capacity and skills development are critical. A shortage of skills, capacity, or knowledge results in foreign nationals implementing many of the projects. The capacity building and skills development training, support the implementation of renewable energy development projects. However, respondents commented on the number of Spaniards employed during construction. One respondent said:

> *"It was at the beginning of 2014 that the first tower was built. Our people don't have the skills. So, the Spaniards needed to come over with their skills and people. Then they took community people, normal workers, and general workers to do general work. And what*

*happened in the meantime is that some of our local people were trained in these jobs. Some of our people are doing it themselves. Some of our people are in Barcelona and Dubai now" (interview 1).*

*"I would say many people are general workers and were sent for training so that they can add new things to their CV. If the solar panel is not there anymore, at least they got a qualification that they can use to find another job. They also got work experience" (Upington: interviewee 2).*

The quote shows that the skills transfer played a critical role in the Upington community. With the country's recent venture into renewable energy development in Upington, some local community members stepped up to the challenge of learning the new innovative technologies. Upington's trained and skilled workforce exploited technological advances to benefit their careers by being competitive abroad in countries like the United Arab Emirates and Spain. The renewable energy sector is a scarce and critical skill that provides the basis for any new qualification or capacity recently developed in the country.

#### *4.6.6.1 Contribution to local economic development*

The renewable energy projects made a difference in the Upington community, contributing to improved well-being and economic growth. There was economic development in small local businesses. The respondent mentioned the sectors benefitted economically from the projects.

*"It was a big injection. Specifically, certain businesses, in other words, Midas. They did a lot of business with them regarding welding equipment and electrical tools like grinders and drills and those kinds of things. They did well. Upington industrial also supply welding equipment and all of those things. They did well. Who else? I think to Build It, they supply wood and so on. I think they also did relatively good business regarding wood for molding concrete structures and stuff" (interview 4).*

The quote above explains that many businesses from different sectors benefitted during construction. This means that many community members' quality of life changed. Even though it was temporary for some, yet others managed to invest wisely. Big and small businesses also benefitted. Even the welding and electrical companies benefitted as few members had many contracts due to export demands for heavy solar equipment components. Even the poor people also benefitted as small businesses employed them.

#### *4.6.6.2 Negative aspects of community empowerment in Upington*

Developing a deep understanding of community issues, encouraging participation from all stakeholders, and strengthening relationships can assist renewable energy companies as some community members do not see an effect in the initiatives they are implementing. Some respondents had a different perspective and voiced their viewpoints on renewable energy companies' socio-economic and economic development in the Upington community.

> *"No, from my side, Abengoa Solar did not contribute to our communities' economic or socio-economic development. They contribute to soft projects where they make a small contribution. For example, they want to contribute to Mandela Day festivities and Women's Day festivities. They don't want to contribute to the actual development of communities" (interview 6).*

The quote refers to soft projects implemented by renewable energy companies. This is a direct result of lines of accountability to the national government, limited contributions to enterprises and socio-economic development in the community. These projects must account for local government. Mandela Day and Women's Day are one-day activities where they usually do the painting or give women gifts.

This again shows a disconnection between community members and renewable energy companies. What they are implementing is not related to mitigating local impacts in communities where projects are developed. This shows that some community members lack trust and need to be part of planning processes and advise on what programmes to undertake. Renewable energy companies need to create an environment for greater participation in communities and local municipalities. Accounting only to the national government, is not assisting the community at a local level.

## 4.7 ADAPTATION AND MITIGATION TO CLIMATE CHANGE

Renewable energy development mitigates negative environmental impacts and climate change, compared to conventional energy generation. Renewable energy resolves environmental and security concerns, posed by conventional energy in a climate-resilient way. Globally, many countries prefer renewable energy development, primarily for its benefits from environmental degradation.

### 4.7.1 Climate change adaptation

The environmental impacts of water usage, and hazardous waste generation (molten salt) from solar power, are no longer a concern in CSP technology development. After the introduction of dry cooling technology, water usage and consumption are being addressed globally. The waste is disposed of in an environmentally acceptable manner. Adapting to current environmental adaptation strategies for CSP development, is a global effort. Waste disposal is critical in an environmentally acceptable manner as per the National Environmental Management Waste Act of 2008 and the International Standard Organisation (ISO 14000) standard. Communities are urged to alter their behaviour by being environmentally conscious. Waste from solar energy is classified as hazardous waste and regulated globally. Respondents refer to waste disposal and their involvement in the process. However, some respondents had concerns about waste management, like broken mirrors from solar plants used in building shacks.

> *"They have companies who work with all their waste. It is driven to Johannesburg. We are quite involved there. They regularly clean the tanks and all the salt goes to Johannesburg" (interview 15).*

The respondent describes that they are involved in the disposal of waste from the solar farm, which means that solutions for environmental protection have been created. Since solar waste falls under hazardous waste, there are specialised companies in Johannesburg where the waste is usually incinerated. Process action of waste inception to final disposal is in place. This waste poses a threat to human health. If not disposed of correctly, health issues can arise directly or indirectly. This waste management reduces the negative impact of waste on the environment, human health, aesthetics, and planetary resources.

### 4.7.2 Climate change mitigation

The international call of action to limit global warming, which involves reducing activities that increase greenhouse gas emissions' concentration in the atmosphere, responds to climate change mitigation. Adopting renewable energy, energy-efficient strategies, and sustainable transportation are ways to mitigate climate change. Developing solar farms in Upington is one of the efforts to reduce the negative environmental impact. However, when it comes to concentrated

solar power, the tower technology, respondents indicate that temperatures are extremely high in its surroundings, so there is a possibility that species are affected by the heat from the tower.

> *"From the panels, it shines on the tower and that temperature. I don't have a number. Let's say it is 1000 degrees Celsius. Then I ask myself what happens if a bird flies between the panel and the tower. Does that heat affect it?" (interview 4).*

The quote means that the heat and brightness released from the solar energy mirrors, from the tower technology, impact the environment and Upington community and there is also a possibility that this heat also impacts species of the bird ecosystem when they fly over a solar tower. Some respondents believe that the heat and brightness coming from the tower might be the cause of altering the intensity of extremely hot weather in Upington. Renewable energy projects are viewed to have a positive impact on climate change. However, in this situation, the tower negatively affects the surrounding community members, due to the heat and brightness coming from the tower. Environmental specialists usually relocate the bird ecosystem before the operation of the plant. Currently, no socio-economic initiative or economic programme mitigates this negative impact.

## 4.8 COMMUNITY TRUSTS

Due to a policy framework, community members in the vicinity of renewable energy projects benefit significantly from the projects. The benefits are beyond the construction and operation of renewable energy projects. These benefits have sometimes failed to materialise, leaving community members confused and frustrated. It is critical that there must be a clear legislative framework for the operation and establishment of community trusts and they should be appropriate in addressing community needs.

### 4.8.1 Community trust establishment and operation

The challenge of establishing and operating a community trust is that the renewable energy companies were not provided substantial guidance by the Department of Minerals and Energy to establish and operate a community trust for renewable energy projects. This is a challenge as there is a question that whether the process applied, might be correct as these projects must be contextually relevant and people-centered. In the case of Upington, respondents are aware and participate in trust.

*"In our area, for example, the community of Khi consists of five towns. The plant is between Upington and Keimoes. The primary communities that are beneficiaries are Bloemsemond, Karieskamp, Soverby and McTaggartskamp, Kalksloot. From each of these communities, there are forms to nominate a trustee. The communities nominate individuals they would like to have in the trust. Each town has one representative on the trust. The IDC has the chairperson's seat. We, the plant, also have a monitoring seat on the trust. The trust consists of IDC, which has the chairperson seat, then the plant has a representative who is mostly your seed manager or your GM, and then from every community, you have one or two representatives" (Interview 3).*

The respondent describes that community members can choose when the trust is established. Practically, councillors are choosing who to sit on trustees in these projects. The renewable energy company and the IDC monitor whether the trust's operations are in the right or not. The challenge is that the local community members sourced locally, to be part of a trust fund, usually lack the skills of those chosen to be trustees and development facilitation, which is the role they have to play. Locally sourced individuals must be skilled to run a community trust. The IDC and renewable energy managers are based in places like Johannesburg and Cape Town, which means they are not in touch with community needs. Community members should choose the best representatives to represent them in their trust. However, this is not the case for renewable energy projects in Upington. The benefits of choosing a community representative to sit as a trustee are that they contribute to local community development and give back to the community while developing their careers. The problem of community trustees is that it can be hugely demanding, attract risks, and give problems that cannot be easily resolved or managed.

### 4.8.2 Community trust satisfies community needs

There are many motives for promoting trust as a vehicle for community development in renewable energy. The renewable energy community trust is not appropriate for satisfying community needs in Upington. Community trusts are usually not established by community groups. Renewable energy companies establish them. They do not originate from the community; sometimes, community representatives are constrained since they are not originators. The problems related to community trusts are well outlined in the quote below:

*"They come from the communities, but like I saw in one of the meetings, what type of arrogance the owners have. Because they feel the trust members won't be able to*

*determine how and when things should be done, they decide how they spend it. The IDC runs the plant's shares at this stage. So, in effect, the decision has been made before the trust took part; a decision has already been made between the government, IDC, and the developer that, before there is any development in communities, people can benefit from the IDC needs to be paid. So, without consulting with communities, the decision is made, so the trust is just there to comply with legislation, in my opinion" (interview 6).*

The quote above illustrates no cooperation or teamwork from community trustees, renewable energy companies, and IDC. Community trustees have no say on how to spend the community trust fund. Instead, IDC and renewable energy companies are working together, leaving community trustees behind those who know what the community needs are. Community trustees know better what is needed in their community at the grassroots level and work closely with community leaders/counsellors. Therefore, these community trusts are not as effective as they should be, since they work independently without including community trustees in their decisions.

### 4.8.3 Black Economic Empowerment Trust

The Black Economic Empowerment (BEE) Act 2003 policy framework structures corporate trust contributions from organisations. The Black Economic Empowerment Trust is guided by the BEE Act of 2003. Companies receive incentives from the government to expand and include black shareholding, spending on skills development initiatives and promoting socio-economic development, especially in vulnerable or previously disadvantaged communities, like Upington. The mining sector is associated with the first community trusts in South Africa, as it formed a blueprint or thinking around how renewable energy community trusts must be structured. The respondent explains the flawed selection of renewable energy trustees.

*"The local councillor of that term is identified, and they make that selection. If the trust's funding grows and we can provide it during the program's start, which started around 2010, 2011, and 2012, their dividends should start growing now. The moment the trust's dividends start growing, I can tell you that we will experience many problems. We have already begun to notice problems. The firm cannot be approached since they are currently the holding company. The trust and the trustees should step up. The communities have started to question why this person is a trustee. Our need is not to send two people for a bursary. Our problem is now that we do not have food. We are looking for food security, so this trust's money should be used" (interview 24).*

The quote indicates that the community trust funds must address community members' needs, like food security. They believe choosing two people for a bursary will not assist them as a community. Community members must choose a deserving representative, someone trusted to represent the community and the trustees should not be chosen by councillors. It is a flawed selection criterion when chosen by the councillor. This means that councillors identified loopholes in these renewable energy trust funds, which can be addressed by the policy development about the renewable energy sector. Since the mining sector formed a blueprint of community trust, the renewable energy sector needs to have stand-alone policies to address identified challenges. The IDC joined renewable energy projects as a BEE, since renewable energy companies were mostly owned by foreign investors who were mostly Europeans.

## 4.9 CONCLUSION

Large infrastructure projects attract migration into that area, especially during construction. Despite the many positive benefits of renewable energy projects in Upington, project developments have both positive and negative consequences. Businesses benefitted massively during construction. The requirements of SED and ED in REIPPP ensure that lower-income people can also benefit. Despite the benefits of the renewable energy developments, most respondents expressed dissatisfaction with increased levels of social ills like drug abuse, prostitution, alcohol abuse and teenage pregnancy, which contributed negatively to the community during the construction phase in Upington.

Many problems existed, but increased during the construction phase. Many babies were born by local teenagers during the project's construction phase. This is another social illness that has become a challenge for the government. Most of these fathers fly back to Spain and the mother and child remain in South Africa. Most of the mothers are without work. These children depend on a social grant from the South African Social Security Agency (SASSA). It is a relief used to support households in distress in terms of shortage of income and this is required for a teenage mother who is not working.

The renewable energy companies miss addressing social ills left during construction and some of the important community needs initiatives. Some of these needs are English medium schools in Upington. There are no English medium schools, which is a need of the community. Owners of renewable energy projects are internationals who understand English. This is a one-way of giving back to the community and English is an official language of communication in South Africa.

Another community need they miss to address, is road maintenance due to roads dug up by heavy trucks transporting solar equipment. There are no mitigation measures for all the negative impacts created by solar projects. Renewable energy companies are aware of the negative impacts created during the construction phase, but do not address the issues. Therefore, there is limited evidence that these companies address key issues related to their negative consequences. Collaborative planning of all critical stakeholders is needed in renewable energy developmental planning to manage many developing challenges and social ills, as it is done in the mining sector.

# CHAPTER 5 :
# CONCLUSION AND RECOMMENDATION

## 5.1 INTRODUCTION

This study investigated how companies mitigate negative perceptions about large infrastructure projects in localities that do not directly benefit from these projects. The main aim of this study was to analyse factors influencing the success or the failure of socio-economic development by renewable energy companies. Globally, companies focus on: job creation, ensuring local economic growth, providing socio-economic benefits, climate change mitigation and developing local community trusts. The literature acknowledges positive and negative aspects of local communities' economic and socio-economic development. I used a qualitative methodology and purposive sampling within a case study design in this study. The qualitative method helps to understand local expectations and how companies have been able to address local expectations.

## 5.2 AN OVERVIEW OF THE MAIN STUDY CHAPTERS

Chapter 2 provided an international perspective. Renewable energy projects generally provide positive socio-economic benefits like job creation, cheaper energy access and community ownership. There are also attempts to mitigate local impacts. The renewable energy sector is often accepted locally, because it mitigates climate change and does not emit carbon dioxide that contributes to global warming.

Chapter 3 focused on the South African policy framework for renewable energy. The roll-out of the REIPP programme, ERA, IRP and the IEP are central policies. The White Paper on Renewable Energy released in 2003 was the first formal policy. The chapter also assessed the Green Economy Accord, which focuses on job creation. Government policies targeted 400 000 green jobs by 2030 and the local procurement accord targets 60% to 75% local procurement of renewable energy components in the REIPP programme. Consideration was also given to the IEP and energy security. The NDP has a vision of 20 GW of renewable energy by 2030 and states that 90% of the population should have access to energy. The Electricity Regulation Act (ERA) of 2006 provides the whole electricity value chain and determination for new renewable generation capacity for clean energy. The chapter also discussed the socio-economic and economic guidelines, criteria, and challenges of the REIPP programme.

Chapter 4 of the study was the thematic analysis of the data gathered during interviews from six focus groups (46 participants) and 16 key informants. The study investigated the role of renewable energy companies' socio-economic development and economic development projects. The interviews developed themes: cheaper energy and load shedding, job creation, community empowerment and development through socio-economic and economic development, adaptation and mitigation to climate change, and community trust. There is a concern that renewable energy companies do not address the negative impacts of their development. Despite many positive benefits from renewable energy developments, the adverse consequences seldom receive attention.

## 5.3 MAIN FINDINGS OF THE STUDY

This section discusses five main findings of renewable energy's local acceptability in local communities. These findings are discussed below.

### 5.3.1 The high cost of electricity and load shedding affects local acceptability negatively

Renewable energy is mainly considered for environmental, social, and economic benefits. The literature shows that the renewable energy sector provides cheaper energy access and continuous sustainable energy to communities (see Chapter 2). The Integrated Energy Plan (IEP) focuses on the country's energy security, energy access, and reducing the cost of energy supply (see Chapter 3). Despite a plan to address high electricity costs and continuous energy supply, the country has no definite plans to halt the adverse effects of load shedding and high costs are likely to continue. Chapter 4 showed the frustration of community members in this respect. Respondents thought that having solar plants nearby would reduce electricity costs and that they would not have load shedding. Community members felt that they did not benefit from the plants and their expectation for lower energy prices, and no loadshedding, did not materialise. Consequently, they struggle to see the benefits of renewable energy projects. Instead, they are paying high electricity costs and their lives are still interrupted by load shedding, just like any other area in South Africa. This challenge will taint the social acceptance of renewable energy plants as the community feels that they do not benefit from these plants, even though they are nearby.

### 5.3.2 Limited long-term employment

One of the benefits of renewable energy development is local employment (see Chapter 2). The Green Economy Accord and the REIPP programme (see Chapter 3) encourage foreign direct investments and local employment. The participants indicated that renewable energy projects created employment in the Northern Cape. However, employment creation is not long-term, as with coal-powered stations. Many jobs were created only during the construction phase. The maintenance and operation phases require less workforce and skilled personnel in specific fields, making it difficult for local people to find permanent employment in renewable energy projects. The community expects long-term employment that will improve their quality of life forever. There is evidence that projects were labelled as if they would provide long-term employment. This long-term employment did not materialise and disappointed many respondents in this study.

### 5.3.3 The role of socio-economic development and enterprise development

Chapter 2 emphasised that the renewable energy sector plays a role in socio-economic development near their development. Chapter 2 also indicated that renewable energy companies engage in socially responsible activities that improve the quality of life for communities. Some positive aspects include local people benefitting and having access to capacity development and skills transfer. However, projects can also have negative consequences, like creating social ills or hampering the environment. In South Africa, the REIPP programme has set several goals for local development. The REIPP programme, the IRP, and the IEP inform South Africa's targets on contributing to socio-economic and economic development (see Chapter 3). Chapter 4 pointed to the positive consequence of local economic development during construction. The local communities saw a huge injection in sectors, such as the property-housing, transport, retail, and electrical and consulting industries. Many communities found jobs from businesses with solar farms, and even the poor found employment. The main concern is that the benefits are not sustainable. After construction, there was a decline in local economic growth. Many participants were unhappy about the increased social ills left in the area, since project developments were due to the immigration influx. The concern is that there is no plan for renewable energy companies and it is still the government's responsibility to address social evils in the area.

### 5.3.4 Local environmental impacts do not receive adequate attention

Renewable energy attracted substantial attention worldwide, because of its environmental benefits. The sector plays a significant role in reducing emissions and mitigating climate change globally. It is a clean alternative compared to the traditional coal-powered stations. European Union countries developed policies that will phase out coal gradually (see Chapter 2). The National Climate Change Response White Paper, the REIPP programme, and the IRP plan are three sustainable policy documents focused on carbon emission reduction initiatives (see Chapter 3). Participants in Chapter 4 indicated positive environmental benefits of renewable energy projects. However, many participants raised concerns about the solar tower's impact on the bird ecosystem. Generally, renewable energy mitigates climate change and reduces the effects of greenhouse gas emissions. However, the CSP technology can harm local communities and animals, due to its brightness and the heat released to nearby areas.

### 5.3.5 Community trust establishment and operation and their role in satisfying community needs

Local community ownership through a community trust is one way of making renewable energy acceptable in local communities. Community trusts provide local communities with shareholding and control, contributing to local benefit (see Chapter 2). There is no guideline for the trust formed, because of renewable energy projects: instead, the mining sector blueprint guides the renewable energy sector. The renewable energy sector is not guided by community trust ownership, operation, and the establishment and also on satisfying community needs. The South African policy framework is silent in this regard. There is no substantial guidance (see Chapter 3). Participants pointed to the flawed selection process of community trustees, where only the councillor in some communities chooses community trustees, based on being connected, without community members' involvement. There is little or no collaboration with critical stakeholders regarding project implementation. One respondent pointed out that renewable energy companies only collaborate with IDC on projects they will implement without involving community members.

## 5.4 RECOMMENDATIONS

The study's main findings, conclusion, and recommendations are illustrated below. There is a link to the main findings and the conclusion.

***Table 5.1: Study main findings and conclusion***

| Main findings | Recommendations |
|---|---|
| ▪ Renewable energy provides cheaper and more sustainable energy access when not connected to the grid. | ▪ Increase local municipality's involvement in the REIPP programme.<br>▪ Roll-out of off-grid technologies such as solar PV rooftop and biogas digesters to minimise high electricity costs and load shedding.<br>▪ Another portion of electricity to be distributed locally directly to community members |
| ▪ The renewable energy sector does not have sustainable and long-term employment, due to scarce critical skills required and local members do not possess the skill after the construction phase. | ▪ Upskill local people through local TVET colleges and universities.<br>▪ Renewable energy companies to embark on capacity building, while focusing on locals.<br>▪ Embark on benchmarking from other provinces, such as the Western Cape and Eastern Cape (these two provinces have a strong drive of capacitating and up-skilling community members in the renewable energy sector). |
| ▪ Projects played a huge role in socio-economic and economic development. There was a huge injection economically and benefits concerning bursary opportunities, community members' capacity building, and skills transfer.<br>▪ However, there is a challenge of social ills, due to a migration influx. | ▪ Stakeholder consultation to identify and address community needs before project implementation.<br>▪ Related projects that address local negative consequences are to be implemented.<br>▪ Collaboration between the national government and local municipalities to address the social ills. |
| ▪ The CSP technology can harm local communities, due to the mirror brightness and affect the bird ecosystem. It must be acknowledged that the local impacts can be detrimental to the community. | ▪ Proper community consultation and awareness on environmental impacts mapping out benefits and negative impacts.<br>▪ The adverse impact on the environment and bird ecosystem can be mitigated. |

| | |
|---|---|
| ▪ Community trustees' establishment and operation require full community participation to satisfy local community needs. | ▪ Policy on renewable energy trustees is required to address community trust operation and establishment.<br>▪ Knowledgeable and deserving community trustee members must be appointed.<br>▪ The community must be involved in the process of appointing a trustee. |

*(Source: Own compilation)*

### 5.4.1 Increase local municipality's involvement in the REIPP programme

There should be an increase in stakeholders' involvement, like local municipalities, when implementing the REIPP programme. The national government or the IPP office must include local municipalities from project inception and throughout all project stages. This will assist in socio-economic and economic project implementation and other funded projects during the project stages. Many of the adverse impacts can be addressed through early involvement by local municipalities.

### 5.4.2 Off-grid technologies roll-out such as solar PV rooftop and biogas digesters

The off-grid technologies, such as the solar PV rooftop and biogas digesters are critical to be rolled out to local communities. This will minimise the impact of high electricity costs and load shedding and address concerns about the lack of local benefit. The high cost of electricity and the planned electricity supply interruptions affect local acceptability and pose a serious challenge to the community. Providing these at lower costs will also ensure a higher level of local acceptability.

### 5.4.3 Local electricity distribution directly to community members

The government must implement a local electricity distribution network to make renewable energy available locally. This will assist in community's social acceptability.

### 5.4.4 Upskill local people through local TVET colleges and universities

Northern Cape's local TVET colleges and universities need to embark on renewable energy training to upskill the local people for long-term employment, as it requires skilled personnel. This will minimise job losses after the project's construction phase.

### 5.4.5 Embark on capacity building focusing on locals

Capacity building for locals by renewable energy companies is critical, since local people are not skilled. Upskilling will increase access to jobs (and even permanent jobs) at the solar plants.

### 5.4.6 Benchmark from other provinces

The Northern Cape Provincial Government needs to benchmark from the Western Cape and Eastern Cape provinces, since these two provinces capacitated and upskilled their community members in the renewable energy sector. Renewable energy training is not common in the Northern Cape and disadvantages the region's local people. The local FET colleges, the Sol Plaatjie University (SPU) and the satellite branch for the Vaal University of Technology (VUT) in Upington must supply innovative technologies and train the skilled workforce required for renewable energy projects. After capacity building or skills development training, limited job opportunities must be prioritised for local communities.

### 5.4.7 Stakeholder consultation to address community needs

All critical stakeholders, including municipalities, need to work with renewable energy companies to identify and address the community needs before the project implementation, since these projects play a critical role in changing people's lives.

### 5.4.8 Projects addressing local negative consequences to be implemented

Adverse local consequences need to be addressed where projects are implemented. The initiatives to address social evils in host towns need to be implemented with every project.

### 5.4.9 National and local government collaboration to address the social ills

A collaborative effort is needed between the national government and local municipality when implementing projects to address the social ills. Companies need to address the negative consequences emanating from project developments. They need to fund projects with related local impacts. Local municipalities need to be involved. The national government should not bypass local municipalities.

### 5.4.10 Proper community consultation and awareness on environmental impacts mapping out benefits and negative impacts

Every project requires proper community consultation and awareness of environmental impacts mapping out the project's benefits and negative impacts. Community members must be aware of the positives and negatives of each project. This also includes renewable energy projects since many people only think about positive benefits.

### 5.4.11 The adverse impact on the environment and bird ecosystem can be mitigated

The bird ecosystem has been negatively impacted and this must be addressed. Community members need to be aware of this impact before projects start. The adverse impact on the environment and bird ecosystem can then be mitigated. It is of paramount importance that the environmental impact assessment must be conducted before project construction and must identify all impacts on the environment. All the adverse impacts can be mitigated.

### 5.4.12 Policy on renewable energy trustees is required to address community trust operation and establishment

Developing a renewable energy trustee policy is required to address community trust operation and establishment. Currently, the renewable energy sector uses the mining sector blueprint, which guides renewable energy trust establishment and operation and this is not effective, as these are two different sectors.

### 5.4.13 Knowledgeable and deserving community trustee members must be appointed

Deserving, knowledgeable community trustee members who will identify all community needs, must be appointed. In some regions, the trustee nomination process is flawed, as there are some concerns that councillors choose who to sit on the trustee committee.

### 5.4.14 Community involvement when appointing a trustee

The community must be involved in the process of appointing a trustee. The community is not represented fully when this happens, as this process of choosing a representative alone has many gaps. All community members must be involved in the process.

## 5.5 FURTHER RESEARCH

The recommendation below emanates from the research:

This study aimed to investigate the role of renewable energy companies' socio-economic development and economic development projects in Upington, Northern Cape.

Despite an extensive plan to deal with socio-economic and enterprise development at the local level, there seems to be a mismatch between what socio-economic projects do and the negative consequences of these developments. The companies can have projects unrelated to their local impacts. Although the problem is multi-faceted, part of the problem is that the reporting lines for socio-economic development are with a national department. Developing plans and projects bypass local municipalities.

Furthermore, the community feels they do not benefit from these plants, even though they are nearby. This will have dire consequences on the social acceptance of renewable energy projects in local communities. Hence, the local municipality must be a critical stakeholder in all processes. Against this background, the following topic is recommended for future research.

***"The social acceptance of renewable energy developments in rural areas: Shareholders' (local municipality) support in addressing the local acceptance and negative consequences of the projects."***

The above suggests that future research will share excellent practices in successfully implementing renewable energy projects.

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## APPENDICES

## ANNEXURE 1: ETHICAL APPROVAL LETTER

UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA

UFS UV

**GENERAL/HUMAN RESEARCH ETHICS COMMITTEE (GHREC)**

08-Dec-2021

Dear Ms Babalwa Mbobo

**Application Approved**

Research Project Title:
**The role of Socio-Economic Development and Economic Development projects by Renewable Energy companies in Upington, Northern Cape Province.**

Ethical Clearance number:
**UFS-HSD2021/1800/21**

We are pleased to inform you that your application for ethical clearance has been approved. Your ethical clearance is valid for twelve (12) months from the date of issue. We request that any changes that may take place during the course of your study/research project be submitted to the ethics office to ensure ethical transparency. furthermore, you are requested to submit the final report of your study/research project to the ethics office. Should you require more time to complete this research, please apply for an extension. Thank you for submitting your proposal for ethical clearance; we wish you the best of luck and success with your research.

Yours sincerely

Dr Adri Du Plessis
Chairperson: General/Human Research Ethics Committee

Dr Adri du Plessis
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## ANNEXURE 2: ORIGINAL ETHICAL APPROVAL LETTER

UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA
UFS UV

**GENERAL/HUMAN RESEARCH ETHICS COMMITTEE (GHREC)**

16-Sep-2019

Dear Prof Marais, Johann JGL

**Application Approved**

Research Project Title:
**Local impacts of Concentrated Solar Powerplant**

Ethical Clearance number:
**UFS-HSD2019/1690**

We are pleased to inform you that your application for ethical clearance has been approved. Your ethical clearance is valid for twelve (12) months from the date of issue. We request that any changes that may take place during the course of your study/research project be submitted to the ethics office to ensure ethical transparency. furthermore, you are requested to submit the final report of your study/research project to the ethics office. Should you require more time to complete this research, please apply for an extension. Thank you for submitting your proposal for ethical clearance; we wish you the best of luck and success with your research.

Yours sincerely

Digitally signed by Derek Litthauer
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**Prof Derek Litthauer**
**Chairperson: General/Human Research Ethics Committee**

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## ANNEXURE 3: INTERVIEW PROFILE

**Main Proposal**

**Local impacts of Concentrated Solar Powerplant**

**Funding:**

**Main contract**: The project is funded by the European Community Horizon 2020 program (H2020-LCE-11-2017, Project number 792103, SOLWATT – "Solving Water Issues for CSP Plants)[1]

**Contract with UFS**: Sub-contracted by Cranfield University in the UK

**Aim:**

To investigate the Community acceptability and livelihood impact of Concentrated Solar Power (CSP) plants on local communities.

**Objectives:**

- To establish the socio-economic consequences of locating CSP plants in South Africa, China, India, Kuwait, and Spain. (This application is only for the South African leg of the research).
- To investigate a CSP plant's livelihood and sustainability impacts local communities close to plants using focus groups and semi-structured interviews across mentioned countries.

**Background:**

Globally, renewable energy plants are becoming the norm, and CSP plants are common. However, global research on the local impacts remains limited. This research is interested in the effect of a CSP plant's construction, operation, maintenance, and decommissioning on different stakeholders like communities, policymakers, and utilities. The focus is on the local economy and environment. Despite the expected social, economic, environmental, and even geopolitical benefits of CSP plants at the macro level, there is a lack of evidence on whether those benefits trickle down to local communities and how they influence livelihoods. The reductions in the costs of CSP plants due to technological advancement may create risks for a 'race to the bottom' whereby international private investors search for countries and locales with the least stringent environmental and social standards for project development. Such risks highlight the importance of addressing these knowledge gaps around how CSP plants influence local communication across social, economic, environmental, and livelihood aspects, emphasising water consumption.

Building on existing livelihood and environmental impact assessment frameworks, the project focuses on the effect of installing large scale plants. Given early stages in the operations of CSP plants, we will aim to draw lessons from other industrial experiences, for example, in mining, chemical processing, and forestry, as well as analysing the relevance of different analytical frameworks around vulnerability and resilience of communities, water resources and ecosystem services in a changing. The review will cover both academic and practitioner sources. However, specifically in the area of CSP, there is much highly relevant expertise to be found in the work of GermanWatch, and the many Institutes with which the project

partners are connected, such as ENIT (Tunisia), MASEN (Morocco), CDER (Algeria), CSERS (Libya), MASDAR (Abu Dhabi), and ASRT (Egypt).

Merely "engaging" with the local community will not lead to local acceptance. The research will focus on the barriers (whether cultural, social, economic, gender-related or ethical) to implementation. In doing this, we will aim to build on insights from energy studies literature on lack of public trust towards utilities, the importance of place attachment, community ownership and community benefits on public acceptability of renewable energy projects. In uncovering these issues, we will focus on long term impacts.

**Site and participant selection and recruitment**

This project investigates the impact of a CSP plant on local communities using an empirical and bottom-up approach. The research team selected five global locations: South Africa (Upington), India, Spain, Kuwait, and China. The sites were also chosen to represent communities that are facing water shortages or water stress. The three specific localities in South Africa are Raaswater, Keimoes and Upington. These were selected based on their distance from the CSP plants.

The project will use two research methods. First, we plan to analyse the importance of these issues within the broader context of the national economy and regional or local policy frameworks using semi-structured interviews with key informants (N=15-25). These interviews will target utilities, policymakers, project developers, planners, CSP operators, government organisations, and academia. They will be guided via an open-ended interview schedule and carried out either by phone or face-to-face. The focus will be on creating opportunities to seek clarification and more in-depth information. The interviews will be recorded and translated into English (if necessary). For these interviews snowballing methods will be used.

The second method includes focus group meetings. We shall three focus groups with 6-8 people in each of the three areas (Raaswater, Upington and Keimoes) (N = 54-72). The interviews will determine the impacts of CSP plants on socio-economic development and the livelihoods of local communities. In organising these workshops, we will consider local culture and traditions in terms of having mixed-gender groups, even though ideally, we would like to have a mix of gender, income and age groups. In particular, we are interested in the perceptions of the costs and benefits of CSP plants by surrounding residents, the impacts of CSP plants on the availability of water resources and any changes impinged upon their daily lives. In doing this, we will aim to build on insights from energy studies literature on lack of public trust towards utilities, the importance of place attachment, community ownership, community benefits on public and acceptability of renewable energy projects. For recruitment, we shall work with a combination of ward councillors, appoint local recruiters and a pamphlet inviting people to participate.

All interviews and focus groups data will be analysed using thematic coding. The output of this task is a report on the socio-economic impact of CSP plants in arid locations.

## ANNEXURE 4: FOCUS GROUP INTERVIEW SCHEDULE

**Community Acceptability & Livelihood Impact**

Interview Schedule

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| **Welcome**<br><br>**TBC.**<br><br>**[15 mins] ALL** | • As participants arrive, welcome them, tell them the location of toilets, invite them to help themselves to tea, coffee and biscuits.<br><br>[A PowerPoint slide will be displayed detailing the Workshop agenda]<br><br>• Tick off their name on the participant list and give them a name label (also categorised as 'A' ', B' or 'C' according to a broad age range.<br><br>• Give them an information sheet<br><br>• Give them the 'entry' questionnaire<br><br>• Give them a consent form<br><br>• Give them a pen and encourage them to take a seat to read and fill in the forms.<br><br>• **One of the facilitators/institution hosts presents the prepared PowerPoints:**<br><br>A PowerPoint slide will be displayed detailing the Agenda of the session also to give an overview of the projects and to give more insights to participants about CSP plants<br><br>**Note**: Any latecomers will presumably be directed to the main room. The facilitator (or helper if we have one) based in the main room will take them to their assigned group, tick them off the participants' list and ask them to fill in their forms while sitting in their designated sub-group (to minimise interruption).<br><br>**Funding**: If anyone asks about funding, this is funded by the 'European commission-H2020.'<br><br>• Introduce yourself, observer (if applicable) and that you are from Cranfield University and the University of the Free State<br><br>• **About the research:**<br><br>o Welcome: Thanks very much for coming today. I hope you have had a chance to look at the Information Sheet [hold up sheet]. The Workshop is about 'investigating the livelihood impact of a CSP plant on local communities, across five different countries across the globe. This is our Workshop here in Keimoes/Raaswater en Upington. Workshops are also being/will held/hold China, Kuwait, Span and |

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| **TBC.**<br><br>**GROUPS** | India, so we can also compare people's views in different countries about Concentrated Solar Power Plants.<br><br>• **About today's discussion:**<br>  ○ There are no right or wrong answers, and this is not a test – hopefully, you might enjoy it!<br>  ○ The aim is to understand the impact of Concentrated Solar Power Plants on your day to day life.<br>  ○ Everyone should express their views, so please speak up (All your opinions will remain confidential, and we will not disclose any names).<br>  ○ However, please, try not to speak while someone else is busy talking.<br>  ○ We have quite a lot to cover, so I may have to cut off the discussion at specific points to move on to the next topic.<br>  ○ Everything you say will be kept confidential, and all information gathered today and used in the report will be anonymised – that is - you will not be identified.<br>  ○ What you say may be used in project documents and published reports.<br>  ○ We want to record the discussion. The recording will assist us to write about the interview accurately. Is that okay?<br>  ○ The Workshop will finish at …….<br>  ○ Lastly, please turn off your mobile.<br><br>• **Any questions?**<br>• May I take your completed consent forms and questionnaires?<br>• Please keep hold of your Information sheet. Our contact details are on the bottom, so if you want to contact us for any reason after the Workshop, then please feel free to do so.<br>• I will also be around at the end of the Workshop if you have any comments or questions.<br><br>[Hand out post-it notes] As the discussion progresses, feel free to write anything that comes to mind on your post-it notes – as well as contributing to the specific. |

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| | [TURN ON DIGITAL RECORDER] |
| **Introductions + warm-up** | • To start with, if you could briefly tell us:<br>o what you do – if you are working or studying, for instance |
| **Time: TBC**<br>**General Awareness and Acceptance**<br>**[Flipchart]**<br>**[25 mins]** | **STAGE 1:**<br>**General Awareness and Acceptance**<br>1. Can you explain what you do know about renewable energy?<br>2. How do you think having the concentrated solar thermal plant in your town/city changed your interest in renewable energy and environmental issues!<br>3. What is your opinion about the concentrated solar thermal project in your town!<br>4. Will you support the construction of more concentrated solar thermal plants in your town? Why!<br>5. How did you find out about concentrated solar thermal development in your neighbourhood!<br>**2. Advantages and Disadvantages**<br>1. Can you tell us about any positive impacts that concentrated solar thermal had on your town?<br>a. How significant are these impacts?<br>b. How long do these impacts last?<br>2. Can you tell us about any disruptions/issues that the CSP project caused in your local area? Do you know in what phase of the project this happened?<br>c. How significant were/are these disruptions?<br>d. How long do these impacts last?<br>3. Overall, do you have any concerns about the impact of these projects in the future! |
| **Time: TBC. approx** | **Social Impact**<br>**1.** What is your opinion about the impact of the Khi Solar One plant on the cultural identity and regional reputation of your town/city? (Such |

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| **Social Capital**<br><br>**Time: TBC. approx**<br><br>**[15 mins]** | as changes in economic profile and revenue characterisation of your town/city)!<br>a. How significant are these impacts?<br>2. Can you tell us about any changes that the concentrated solar thermal plant (Khi Solar One) has made to the social structure (such as population size, social inequality) of your town!<br>a. How significant these changes are/were?<br>b. How long these changes last!… |
| **Financial**<br><br>**Time: TBC approx**<br><br>**25 Mins** | **Financial**<br>Can you tell us about the main economic benefits of concentrated solar development thermal (Khi Solar One) in your town?<br>a. How significant these benefits are!<br>1. Can you tell us the main economic disadvantage of developing the concentrated solar thermal plant (Khi Solar One) in your town?<br>a. How significant they are!<br>2. What do you think about the impact of the Khi Solar One plant on your town's living standard and lifestyle!<br>a. How significant are these impacts?<br>3. What is your opinion on the impact of concentrated solar thermal (Khi Solar One) on local jobs? Do you think the project creates/creates more jobs in your area?<br>a. How significant are these impacts? (Very low, low, medium, high)<br>4. What is the industry and income of your town? Can you tell us about any issues/changes the concentrated solar thermal project (Khi Solar One) made to your town's primary activities/ industry?<br>a. How significant these impacts are!<br>5. How do you think the concentrated solar thermal development (Khi Solar One) has changed your town's economic activities (e.g. purchasing, or selling goods or services) of your town!<br>a. How significant these impacts are!<br>b. How long these changes last! |

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| **Welcome back**<br><br>**5 mins**<br><br>**Natural Impact**<br><br>**[20 mins]** | **STAGE 2:**<br><br>1. Tell us about any environmental impacts (e.g., noise pollutions, air pollutions) that concentrated solar (Khi Solar One) had/have in the neighbourhood.<br>a. How significant are these impacts?<br>b. How long do these issues last?<br>2. Tell us about any disruption that the concentrated solar thermal (Khi Solar One) caused on the wildlife in your region?<br>a. How significant was/is the issue?<br>b. How long did the issue last?<br>3. Since installing the Khi Solar One plant, have you encountered any issue accessing water for your day-to-day life (drinking, agriculture)! Have you had this issue before?<br>a. How significant was/is the issue?<br>b. Is this issue still there, or it was temporary?<br>3. What is your opinion about the impact of concentrated solar thermal (Khi Solar One) on agriculture activates?<br>a. How significant they are!<br>b. How long these changes last!<br>4. To what extent do you think the concentrated solar thermal project (Khi Solar One) has hurt the land value of its surrounding land for agriculture activities!<br>5. In your opinion, what is the impact of the concentrated solar thermal plant (Khi Solar One) on the water access or water security of on local area around the plant!<br>a. How significant they are!<br>b. How long these changes last! |
| **Human and Physical**<br><br>**Impact 25 min** | • **Human Impact (Discuss following in 25 mins)**<br>1. Are you aware of any issue that the concentrated solar thermal (Khi Solar One) workers (e.g. health and safety issues) come across during their time working there! |

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| | a. If yes, how significant these issues are?<br>2. Can you think of any changes in the wellbeing and health of people living around plants due to the development of a concentrated solar thermal plant (Khi Solar One) in your area?<br>3. Can you tell us about any changes to your working conditions (such as wages) due to the developments of this project (Khi Solar One) in your town/city!<br>4. To what extent concentrated solar thermal development (Khi Solar One) in your town change local knowledge and skills? (For example, any training for workers in the concentrated solar thermal field?<br>**Physical:**<br>Can you tell us about any improvements made in your community infrastructure (such as access to clean water and health care facilities) due to concentrated solar thermal development (Khi Solar One) in your town/city?<br>The facilitator summarises the key themes of the session.<br>Participants have the opportunity to raise:<br>Differences?<br>Similarities?<br>Conclusions<br><br>Thank you very much for coming.<br>Let us know if you have any further questions/comments.<br>Alternatively, you can contact us - details on your Information Sheet – if anything comes to mind at a later date. |
| **Closing all** | Thank you again, answer any questions, and listen to any comments. |

## ANNEXURE 5: INTERVIEW TOPIC GUIDE

**Key Informants**

**About the research:**

Thank you very much for accepting to talk to us today. This research aims to 'investigate the livelihood impact of a CSP plant on local communities. This study is also held in China, India, Kuwait, and Spain to compare the views of experts about CSP plants in different countries. I want to learn more about your views and perception about the Concentrated Solar Power plant in the Upington, Keimoes and Raaswater area.

**General Questions**

1. What is your opinion about concentrated solar thermal power plants (Khi Solar One)?

2. How did this project come about! What was/ is the primary driver of the development of this project Khi Solar One?

3. What were the main challenges/barriers that the Khi Solar One plant has faced during its development?

a. Are you aware of any public opposition the Khi Solar One project faced during its development? If yes, do know you what the cause was?

b. In; overall, what do you see as the main barriers to CSP development (Khi Solar One) in your country!

4. What is your opinion on the most prominent benefits of the Khi Solar One plant in your town/city?

5. Can you tell us about any issues/disruptions that CSP (Khi Solar One) has caused to the day-to-day lives of local people in the town during its construction or operation! How significant were these disruptions?

**Physical (Regional Infrastructure)**

6. What are the impacts of the Khi Solar One on energy infrastructure and energy access of your town/city! How significant were/are these impacts?

Financial

7. What is your opinion about the impact of concentrated solar thermal (Khi Solar One) on other economic activities such as agriculture or……?

8. To what extent do you think the CSP project (Khi Solar One) has/hurt the land value of its surrounding land for agriculture activities!

9. Can you tell us about any issues/changes the CSP project (Khi Solar One) has made to your town's primary activities/ industry? How significant they are! How long these changes last!

10. What is your view on the impact of concentrated solar thermal (Khi Solar One) on local businesses and SMEs?

a. What is your opinion on the effect of the CSP plant (Khi Solar One) on the employment opportunities in …. City/town? How significant are these impacts? (Very low, low, medium, high)?

11. What is your view of the effects of the Khi Solar One plant on the living standard and economic situation of the local community around the plant! How significant are these impacts?

**Social**

12. Can you tell us about any changes that the CSP plant (Khi Solar One) has made to your town's social structure (such as population size, social inequality) of your town! How significant these changes are/were? How long these changes last!

13. What is your view on the impact of the Khi Solar One plant on the cultural identity and regional reputation of your city/town!

**Natural**

14. What is the impact of the CSP plant (Khi Solar One) on the water access/ water security of on local area around the plant!

15. Can you tell us about any changes that the CSP plant (Khi Solar One) has made to the local landscape and wildlife of the region? How significant these changes are/were? How long did these changes last!

**ANNEXURE 6: CERTIFICATE OF LANGUAGE EDITING**

Michelle Woolley

WRITER EDITOR PROOFREADER TRANSLATOR

Bachelor of Library and Information Science: B.Bibl.
Reference & Research Librarian

Associate Member of Professional EDITORS' Guild (PEG)

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Date: 20/07/2022

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