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A critical analysis of how Independent Power Producers (IPP's) can help to secure a sustainable future for post-mining towns in South Africa through new models of architectural practices, to promote the renewal of architecture as a means of creating new realities and being drivers of sustainable change

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A critical analysis of how Independent Power Producers (IPP's) can help to secure a sustainable future for post-mining towns in South Africa through new models of architectural practices, to promote the renewal of architecture as a means of creating new realities and being drivers of sustainable change.

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A research proposal submitted to the Faculty of Engineering and the Built Environment, University of the Witwatersrand in partial fulfilment of the requirements for the degree.

22.08.2018

Candidate's Declaration

I declare that this thesis is my own unaided work. It is being submitted for the Degree of Master of Architecture in Sustainable and Energy Efficient Cities to the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination to any other University.

……

(Signature of Candidate)

On the……. Day of …….. Year ……

Abstract

This thesis aims to understand the role that Independent Power Producers (IPP's) can play in the renewal of architectural firms in creating new realities and how these firms can once again become drivers of social change. Kathu (Northern Cape), a steel mining town, is facing the reality that it will have to survive without a mining house and the community funding that results from its operations soon.

There are three IPP's within a 50km radius of Kathu. Under the current funding structure all 3 IPP's have to contribute to socio-economic development (SED) and enterprise development (ED) within Kathu. According to the Independent Power Producers Procurement Programme (IPPP's), IPP's are required to provide 1% of gross turnover to community funds for SED and ED development programmes. Where this funding differs from funding obtained from mining houses is that renewable energy is effectively limitless. Despite IPP's having a projected lifespan of 20 years they will continue to be redeveloped and upgraded. These upgrades will allow for longevity of revenue, which in turn allows for sustained support for the communities surrounding them.

Funding structures that are being used to disseminate mining house funds to the communities are suffering from governance issues. This means that the communities do not receive the most effective or necessary forms of development. Through a new typology of architectural practice, the way these funds are managed and utilised can create better environments for those communities.

This new typology of architectural firm must move away from the corporate and profit driven nature of modern architectural firms and more towards a 'Rural Studio' model. This is where the primary focus is on the community and how to best serve the needs of the people. In doing so SED projects would be more effective in bringing about social change, creating new realities for communities and drivers of sustainability in post-mining towns in South Africa.

Key Words: Independent Power Producers, Community Funding, Socio-Economic Development, Enterprise Development, Architecture, Social change.

To my parents and my twin, for always being my compasses in life.

Anthony, Vicky and Antonia Harrison

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Nomenclature

IPP - Independent Power Producers

SED – Socio-economic Development

ED – Enterprise Development

DoE – Department of Energy

VOC - Dutch East India Company - Vereenigde Oost-Indische Compagnie

SACoL – South African Confederation of Labour

SANNC – South African Native National Congress

SACP – South African Communist Party

COSATU – Congress of South African Trade Unions

ANC – African National Congress

REIPPP – Renewable Energy Independent Power Producers Procurement Programme

BEE – Black Economic Empowerment

IRP 2010

FTF – Foundations, Trust, Funds

IDC – Industrial Development Corporation

REIPP - Renewable Energy Independent Power Producers

RFP – Request for Proposals

DBSA – Development Bank of South Africa

NGO – Non-Governmental Organisation

DGP – Gross Domestic Product

CSI – Community Social Investment

Chapter 1 – Introduction and Background

1.1 - Title

A critical analysis of how Independent Power Producers (IPP's) can help to secure a sustainable future for post-mining towns in South Africa through new models of architectural practices, to promote the renewal of architecture as a means of creating new realities and being drivers for sustainable change.

1.2- Introduction

This thesis will look at the role of Independent Power Producers (IPP's) in funding Socio-economic (SED) and Enterprise Development (ED) in post-mining towns in South Africa. It will examine how a new typology of Architectural Practices can help to create new realities for these communities through a renewal of architecture as drivers for social change. A key component of understanding how to develop a new typology of architectural practices will be to understand David Harvey's 'resilience theory' (Harrison, et al., 2014) and Henri Lefebvre's theory of 'the right to the city' (Lefebvre, 1996). The new typology of architectural practice that will allow for this will have to move away from the corporate and profit driven nature of modern architectural firms, and more towards a 'Rural Studio' model. This model primarily focuses on the community and how best to serve the needs of the people. In doing so, SED and development projects could be more effective in bringing about social change.

1.3 - Problem Statement

Current funding structures for SED and ED by mining houses have proven to be problematic due to governance issues. IPP's have the opportunity to develop a new funding structure that can better serve local communities and ensure that they have a sustainable future post-mining.

By doing so the IPP's SED and ED funding models release architectural firms from capital driven business structures and return architecture to being a model for crafting reality as a social agent for sustainable development.

1.4 - Research Question

How can the IPP's funds help create a new typology of architectural practice that can once again become a means of creating new realities and thus bringing about social change in post-mining towns?

1.6 - Ethics Concerns

The first ethical concern in this project will be that data that is collected is done so accurately and that it is portrayed in the way that it was intended by the party or parties from whom it was collected (SACE Research Project, 2014).

In some cases when collecting data from primary sources it may be necessary to maintain the source's confidentiality. This may be for assorted reasons. All parties that are willing to be primary sources must do so consentingly and their participation in this research project is voluntary.

If or when it becomes necessary to speak to primary sources that are located in the Kathu it will be necessary to inform them that this is a research project and will not directly affect or better their position at this stage.

1.7 - Limitations

The projects limitations mainly lie around the ability to access reliable data on current funding structures (University of Southern California, 2017). There is a limited amount of information on exact breakdowns available to the public so it will be necessary to request information from either the community trust funds or from the companies from

which the funding comes. However, both might be reluctant to share such information, as it may be possible from such information to see where there are discrepancies.

There is almost no existing research on this specific topic in a mining town context or in the context of an IPP funding structure. This makes this more of an exploratory investigation rather than an explanatory investigation. As South Africa currently has the biggest and most advanced IPP network in Africa there is little in the way of IPP SED and ED structures that relate to an African context.

Brazil is one of the few countries that has a high proportion of IPP and sustainable energy production however these companies are not required to set up SED and ED developmental programmes. But rather to pay taxes to the federal government and from these funds are distributed to local community trusts.

It is unlikely that this research project will lead to a 'finished' product. But rather lay the ground work for further research into the topic.

1.8 – Structure of Document

Chapter 1 – Introduction and Background

Chapter 1 of the document is an introductory chapter, which gives a concise overview of the study, the research questions and problem statement.

Chapter 2 – Research Methodology and Research Design

Chapter 2 is made up of the research methodologies and the design of the research to be conducted. How the data was collected for the study is also explained in this chapter.

Chapter 3 – Literature Review and Theoretical Frameworks

Chapter 3 constitutes the Literature Review for the study. Here, it explains the background for the study and how the history of South Africa has led to the current situation, with regards to mining communities. In this chapter the theoretical frameworks that have informed this study are discussed.

Chapter 4 - Understanding SED and ED funding models in relation to mining towns – Status Quo

Chapter 4 presents an understanding of SED and ED funding. It explores what the status quo of the SED and ED structures are. From here it links these structures to existing mining towns.

Chapter 5 – The role that IPP's can play in SED and ED in post-mining towns

Chapter 5 breaks down the rolls that IPP's can play in post-mining towns with relation to post-mining towns. In this chapter there is an exploration of different SED and ED structures that are being employed by IPP's and community trusts.

Chapter 6 - How IPP SED and ED funding can develop a new typology of architectural firm that can become an agent for social change?

Chapter 6 explores how IPP funding structure could help to develop a new typology of multi-disciplinary Architectural Firm or 'Development Firm'. Further examining how this new typology could become an agent of social change in post-mining towns.

Chapter 7 – A new Architectural firm – creating sustainability in post-mining towns in South Africa

Chapter 7 details how this new typology of Architectural Firm or Development Firm could go about creating sustainability and resilience in post-mining towns.

Chapter 8 – Conclusions

Chapter 8 details the summation of the study and highlights the conclusions and recommendations that have resulted.

1.9 - Delimitation of study and assumptions

At the time of the commencement of this study it was still believed that the Department of Energy (DoE) viewed the Renewable Energy (RE) sector as the future of the country's power production solution. However, during the course of 2017 it has become apparent that the Government and DoE no longer see the RE sector and more specifically the REIPP sector as a means of solving the country's energy problem. This works in tandem with the plans to reduce carbon emissions to meet the required reductions of programmes such as the Paris Agreement, which South Africa became a signatory in April 2016 (Department of Environmental Affairs, 2016).

The Government has now turned its attentions to nuclear energy. There appears to be several reasons for this, but most of them seem to be politically motivated.

Chapter 2 - Research Methodology and Research Design

2.1 – Desktop Research Method

This research strategy allows the study to be carried out primarily as desktop research. Therefore, it does not require the researcher to visit or spend vast amounts of time on site. The initial research will utilise secondary sources, such as the reports that have been reviewed in the initial literature review. These secondary sources will focus on existing sustainable socio-economic development funding models and structures, as well as literature on how mining towns are affected when a mine ceases operation. The next stage of the project would look at primary sources to help contextualize existing strategies within a South African and more specifically a 'Kathu' context. This would help to determine what the risks, (successes and failures) are of the existing funding models and the effects they have on producing sustainable socio-economic development. At this stage, it will also be important to assess how the business model of an architectural firm could align with the new proposed business and funding model that will be formed as the final product of this research project.

2.2 – External Desktop Research

An external desktop research method refers to the fact that information has to be gathered from sources that are not available from within the institution or organisation from which the researcher is conducting their research.

There are two major components of an external desktop research method.

2.2.1 - Online Desktop Research

There is an unlimited amount of data that can be collected from online sources. It is therefore vital that the researcher be very critical of the sources that they decide to include. The nature, relevance and credibility of the source must all be taken into account when deciding what sources to use in the researcher's study. By using sources that do not have good credibility the credibility of the researcher's own study

can be brought into question. The researcher needs to follow a strict pattern of refining search techniques so as to obtain only the most relevant data Therefore, it is of the utmost importance that extreme care is taken when conducting online data collection.

2.2.2 - Government Published Data

Governments usually publish large amount of data on projects, policies and directives that are being pursued or developed by the relevant government branch or agency. These documents can often be beneficial to the researcher's study because they show the planning and policies that lead to the development of specific projects. The data often covers many aspects, including social, economic, environmental and financial avenues. This type of data can often provide a good overview of the topic being researched. However, it is important to note that once again the researcher needs to be critical of the data that is published. Government policies are often written and passed by the ruling party or parties, thus there can be a political slant placed on the policies. It is important to recognise these biases and treat the relevant data accordingly.

2.2.3 – Primary Data - Interviews

Primary Data collection for this study took the form of one on one interviews. The candidates for these interviews have been carefully chosen based on their profession, experience and knowledge on the specific topic, or specific elements of the topic. This was dependent on the specific expertise of the deferent interviewees

2.2.4 - Case Study Method

This research is based in the Kathu area, and therefore it was necessary to utilise Kathu as a case study to understand what the status quo of the development, SED and ED funding was.

2.3 – Primary and Secondary Data Collection

2.3.1 - Primary Data

Primary data was collected in the form of one on one interviews. The interviewees were carefully selected based on their expertise in specific aspects of the topic. The first interviewee that was selected is a former employee of an IPP that operates in the Kathu area. This individual was responsible for the company's sustainable development programmes, and as such had a vast knowledge on the intricacies of the SED, ED, community development and community trust management. A list of interview questions can be found in Appendix A

The second interviewee was a representative of a consulting firm who specialise in corporate advisory, monitoring, reporting, administration and management of sustainable development projects. Each was selected because of their expertise in the management and administration of community trust, as well as their interdisciplinary approach to providing service within this space. A list of interview questions can be in Appendix B.

2.3.2 – Secondary Data

Secondary data for this study was collected from a myriad of different sources. Inclusive of books, journals, reports, websites and online articles. Throughout this process of collecting secondary data it was important to access each source for its relevance, authenticity and credibility. Only once the sources were critically accessed could they be used. From this stage the data had to be analysed and sorted into groups of relevant or corresponding information. These are then linked together to formulate an understand of the specific topics that this data was informing.

Chapter 3 – Literature Review and Theoretical Frameworks

3.1 - Literature Review

It is important to note that the history of South Africa and the history of mining in South Africa are integrally linked. Mining in Southern Africa dates back to 41 250 BC, when late stone age peoples started quarrying haematite the mineral form of iron oxide. They used this as a source of red ochre, which was used for cosmetic and ritualistic purposes. (South Africa.net, 2017)

3.2 - History of South Africa

South Africa is home to the Cradle of Humankind. It is located 50km northwest of Johannesburg and is the site of some of the discoveries of earliest hominid fossils. It is a widely accepted fact that humankind first came into existence in sub Saharan Africa and dispersed from between 1.8 million and 800 thousand years ago.

Sub Saharan Africa is the longest continuously inhabited place on earth. As a result, the history of the area dates back many thousands of years, with modern man inhabiting the southern tip of Africa for more than 100 000 years (Government of South Africa, 2017).

About 2000 years ago South Africa was inhabited by several different indigenous peoples. The coastlines were inhabited by the Khoikhoi (Hottentot) peoples, who were pastoralist communities. The interior of the country was inhabited by the San people (the Bushmen) who were hunter gatherers. It was around this time that Bantu speaking agropastoralists started moving down into South Africa. They settled in much of the interior, ranging from the eastern lowlands to the Highveld (Government of South Africa, 2017).

The first European contact with the Cape was when Bartholomeu Dias unknowingly rounded the Cape in 1488. He travelled as far as Port Elizabeth before turning around. On the return journey Dias stopped in what is now known as False Bay and erected a cross. The then Portuguese King, John II, named the Cape 'the Cape of Good Hope' (South African History Online, 2011).

In 1503 the Portuguese explorer Antonio de Saldhana unwittingly sailed into Table Bay mistakenly thinking that it was False Bay. In 1510 Francis de Almeida, the first Viceroy of the Portuguese Indies also sailed into Table Bay in search of water (South African History Online, 2011). Some of his crew ventured to a nearby Khoikhoi village to trade with them. However, there was soon conflict after a failed attempt to kidnap some children. The result of this conflict was that the Khoikhoi defeated the Portuguese sailors and forced them back to their ships. As a result of this first interaction between Europeans and the Khoikhoi the Portuguese avoided the Table Bay area as best they could. (South African History Online, 2011)

In 1602 the Chamber Representatives of the Netherlands Parliament granted the founding chapter to the Dutch East India Company (Vereenigde Oost-Indische Compagnie -VOC). (South African History Online, 2011) The VOC served as an agent of the Dutch Government and as such were responsible for taking possession of lands, expanding trade routes and establishing trading outposts. In 1651 the VOC, was one of Europe's largest trading companies, decided to develop a permanent settlement in the Cape, to use as a waypoint and refreshment station for its ships sailing to the spice route to the East. In late 1651 Jan van Riebeeck was commissioned by the VOC to establish this outpost and to build a fort to defend against attacks from the Khoikhoi and other European countries that were, at the same time, becoming more active in the area. Van Riebeeck landed on the shores of Table Bay on the 6th of April 1652 and proceeded to carry out the wishes of the VOC. (South African History Online, 2011).

The Cape trading outpost steadily grew, with some of the VOC's employees being released from their contracts and given land to farm. They were barred from trading with the Khoikhoi and had to sell their produce back to the VOC trading outpost. The outpost continued to grow to the stage where it was being referred to as a town. This was never the intention of the VOC. However, when war broke out between the Dutch,

the English and the French the VOC declared themselves rightful owners of the Cape. (South African History Online, 2011)

In 1795 the British, who were at war with France, invaded the Cape and took control of the Colony and Cape Town until they handed it back to the Dutch in 1803. Then three years later the British once again invaded the Cape, but this time they would not return it and they peremptorily occupied the Cape Colony. (South African History Online, 2011)

From the initial 1652 colonialisation came "slavery and the forced labour model. It was this model that was then transferred to the Afrikaaner Republics of the Orange Free State and the Zuid-Afrikaansche Republiek" (South African History Online, 2011). Because of the Khoikhoi's pastoral way of life, it was difficult for the Dutch to force them into labour. However, by breaking down this way of life they were able to enslave some of the Khoikhoi peoples. The VOC required large numbers of agricultural labourers to work on the farms in order to be able to supply their ships at the cape outpost with fresh produce. Because of this in 1658 the first slaves were brought into the Cape Colony. The vast majority of these slaves were from elsewhere in Africa as well as the Indian subcontinent. (South African History Online, 2011)

When the British took control of the Cape Colony in 1795 they continued the slave trade. Once the British returned the Colony to Dutch rule, the Dutch continued to grow the trade. Whilst slavery was illegal in the Netherlands, it was supported by the Roman-Dutch legal framework that was brought to the Cape by the VOC. When the British once again took control of the Cape they had started to form an understanding of concept of human rights and as such started to question the practice of slavery. In 1806 the British introduced the Amelioration Laws which aimed to improve the quality of life for slaves. However not all slave owners adhered to these new laws and quality of life for slaves was still very poor (South African History Online, 2011).

> *"The end of slavery at the Cape was not due to internal pressure, but from a decision from outside. In 1807 the British government banned the slave trade to all her colonies, including the Cape. This meant that no*

> *more slaves (from any destination) could be sent to work in the Cape. However, those who were already in the Cape continued to work as slaves until 1834 when all slaves in the British Empire were to be set free (emancipated). Many of the slaves chose to remain on with their owners while some started a new life in and around Cape Town working as tradesmen. Gradually these people became absorbed into the Cape community."* (South African History Online, 2011)

Whilst slavery was banned by 1834 this did not mean that employees were treated or paid well. Exploitation of indigenous peoples was still rife in the Cape and Afrikaaner Republics as well as in the British Natal Colony. With the 1866 discovery of Diamonds in the Cape and subsequent discovery of the Gold in the Witwatersrand South Africa once again saw an influx of migrant workers. However, this time their migration was voluntary. Miners came from all over the world.

In 1910 the British invaded the Orange Free State and the Zuid-Afrikaansche Republiek and for the first time brought all the four provinces together under one name, the Union of South Africa. It was at this stage that the De Beers and Anglo-American mining companies were formed. Today these two companies are still world market leaders in the mining industry. These two mining houses had a major effect on the employment landscape of South Africa because they both had effective monopolies in their own fields. Smaller mining operations were bought up by De Beers and Anglo-American and they have dominated the industry ever since. (Hanns Seidel Foundation, 2013).

South Africa's early history has been plagued by slavery and exploitation of indigenous peoples. It is essentially upon those people's backs that South Africa developed into what it is today. From the early 20th century mining became the major driver of the South African economy and to understand this further one must first understand the history of mining in South Africa.

3.3 - History of Mining in South Africa

There is evidence that South Africa had active iron-ore, copper and tin mining and metal working industries from the 5th century onwards. The modern era of mining in South Africa had its roots in the copper rich ground of the Namaqualand in the Northern Cape. Mines started to develop here from 1852 onwards. The first being located on the Springbokfontein farm, now the location of the town of Springbok.

A major catalyst of the mining industry in South Africa was in 1866, with the discovery of diamonds in the Northern Cape. The discovery of the Eureka diamond and the Star of Africa diamond ignited South Africans first major mineral rush (South Africa.net, 2017).

In 1875 gold was discovered for the first time in the Transvaal. This discovery took place on the Kromdraai farm, near Krugersdorp. In 1883 the “Pioneer” reef was discovered and in 1886 the rich Main Reef was discovered. This lead to the major gold rush that would turn South Africa into the biggest producer of gold in the world up until 2006. (USA Gold, 2017)

The primary effect of the mining rushes was the need to find a supply of mine labourers. This became the main priority of the British Colonial Authority; this labour was mainly supplied by African countries. The authorities also formulated policies that were designed “to drive the African population into the developing urban mining centres (without effectively integrating them into society)” (Hanns Seidel Foundation, 2013, p. 3). These policies were fundamentally the precursors of Apartheid. In 2012, it was surmised that “This set of assumptions and policies informed the development of segregationist ideology and later (from 1948) apartheid” (Government Communication and Information System, 2012, p. 22).

The second effect of the discovery of the vast underground riches, was the ascension to power of the mining houses. Many new mining houses were formed, these include Goldfields of South Africa, Rand Mines, Anglo American, De Beers (Diamonds) and Anglo-Transvaal Consolidated Investment Company. Initially the mining houses

solitary purpose was to obtain foreign capital for investment. An example of which is the development of Anglo-American, which was formed to activate capital from America and British investors. (Segal & Malherbe, 2000)

In 1889 several of these mining houses banded together and constituted the Witwatersrand Chamber of Mines. This was done to “strengthen their case against global competition and the government” (Hanns Seidel Foundation, 2013). The intention of the organisation was to “disseminate authoritative statistical information about the Transvaal Golf Fields Limited and to validate prospectuses” (Chamber of Mines of South Africa, 2017). Other objectives of the Chamber were to create a uniform standardised treatment of black mine workers and to create a Railway network within the Union (Chamber of Mines of South Africa, 2017). The Witwatersrand Chamber of Mines went on through various name changes and reorganisations to become the Chamber of Mines of South Africa. Today it still dominates the South African mining industry as it did from its inception.

It is through these companies and the Chamber of Mines that South Africa became a major player in the world’s mineral markets. “The gold mining industry played a substantial role as a foundation industry in the evolution of South African industry” (Short & Radebe, 2007).

> *The mining houses created the South African money and capital markets by functioning as investment banks, pioneered other mineral resources besides gold, and used their economies of scale to centrally purchase material, employ highly skilled labour to form a central intelligence unit, and monopolize the unskilled labour market* (Hanns Seidel Foundation, 2013)

As South African mining industry continued to grow and it also continued to be the backbone of the South African economy, as it is to this day.

3.4 - Mining Linked to Inequality, Socialism and Labour Movements

There is a very clear link between mining in South Africa and inequality, especially amongst the unskilled labour force. There can be no surprise that the working, living and social conditions that mine labourers were subjected to led to the dissemination of Socialistic concepts throughout the population.

Inequality has been a characteristic of South Africa since the first Europeans landed on the countries shores. Since day one the indigenous peoples of Africa have been treated as a labour force. During the course of early South African history this view changed very little. Even though slavery was outlawed in 1834 it essentially remained in all but name, with very little changing in terms of social equality.

The history of Socialism/Communism in South Africa can be traced back to mining, it was the influx of European miners, who came to South Africa seeking their share of the country's vast mining wealth, who brought with them the teachings of Karl Marx and Friedrich Engels. It was from these European migrants that Socialistic and Communistic ideologies disseminated into the South Africa workforce. (South African History Online, 2016)

In the late 19th and early 20th centuries Socialism and Communism were not new concepts. In fact, some elements of Socialistic/Communistic ideology can be attributed to ancient Greek philosophers like Plato and Aristotle, as well as Persian philosopher Mazdak. (Cole, 1953, pp. 1-10). Socialism/Communism in its modern sense was brought into prominence by the works of Marx and Engels. They had published the Communist Manifesto in 1848 and it was widely available in Europe at the time that European miners moved to South Africa. Such was the persuasive nature of Socialist/Communist ideology that soon after the Manifesto was released revolutions spread across Europe, these revolutions became known as the 'Spring of Nations' or more simply the 'Revolutions of 1848'.

It is important to note the difference between Communism and Socialism, although there are common traits in both. Both Communism and socialism are alternative

strategies to capitalism. They both focus on equality, however the means of creating and distributing that equality differ. “In a Communist society, the working class owns everything, and everyone works toward the same communal goal. There are no wealthy or poor people -- all are equal, and the community distributes what it produces based only on need. Nothing is obtained by working more than what is required” (Investopedia, 2015). In theory, this seems like a good way of creating equality across the population, but in practice, Communism in its pure form results in low productivity because there is no incentive to work harder or be more productive as ‘all should be provided’. This lack of productivity then often leads to widespread crippling poverty.

Socialism on the other hand does not state that everything must be owned by the working class but rather that everything is owned by the government. Workers are paid a wage which they are free to spend as they wish. Workers receive basic needs from the government that they require to survive, but there is still very little in the way of motivation to achieve more or work harder (Investopedia, 2015).

It is not difficult to see where the attraction lay in either Communist or Socialist ideology, especially if one finds oneself in a segregated, exploited and persecuted workforce. Therefore, consequently Socialistic and Communist ideologies found a place in South Africa’s workforce.

The way that these ideologies were disseminated into the workforce was through Trade Unions. The first Trade Unions started to appear in the 1880’s, an early example is the South African Confederation of Labour (SACoL). Initially worker’s unions were for white workers only, they also excluded women from unions. These types of trade unions favoured employment policies that were based on racial discrimination. This cannot be viewed as surprising given the country’s historical disunity (History Buffs, 2015).

The South African Native National Congress (SANNC) was formed in early 1912 and was a reaction to the situation of systemic racial exclusion and discrimination by the government of the new Union of South Africa. Despite the SANNC’s mandate to “unite Africans in the advancement of their political and socio-economic status” (South

African History Online, 2011), they were also exclusionary in their membership only allowing black people of a certain class, gender and a certain level of tribal status to become members and participate. By 1917 the first black trade unions had started to form, however it wasn't until they joined with the SANNC that their power was truly displayed. From the beginning the SANNC held Socialistic and Communistic ideologies.

The South African Communist Party (SACP) was formed in 1921. The SACP had many similarities in the ideologies with the SANNC and along with the SANNC they continued to spread Communist and Socialistic doctrine throughout the working class. In 1923 the SANNC changed its name to the African National Congress (ANC) (South African History Online, 2011). There has always been a strong Communist/Socialist ideological component within the ANC. Today there is still a strong Communist/Socialist ideological element within the ANC, this is evident by the existence of the Triparthied Alliance, an alliance between the ANC, SACP and Congress of South African Trade Unions (COSATU).

Labour movements in South Africa are directly linked to the development of Trade Unions and the fight against racism and national liberation. It was the combined pressure of these movements, the Trade Unions, political parties and international pressure that finally broke the 'chains' of Apartheid.

3.5 - The Relationship Between Industrialisation and the Development of Cities

The relationship between industrialisation and the development of cities or urbanisation is one that has been reviewed by many scholars. The relationship is undisputed as many major cities in the world today are only the way they are because of the role that industrialisation has played in their development. Without industrialisation, many of those cities may have remained relatively small and insignificant on a global scale or like in the case of Johannesburg may have not developed at all.

There is a dispute on how much industrialisation determines the development of cities. Henri Lefebvre, as stated in (Purcell, 2002, p. 148), rejects the "economistic idea that the city is merely the spatial product of industrialization." Lefebvre argues that cities both existed and developed prior to industrialisation so therefore cities cannot just be viewed as a spatial product of industrialisation. "Industrialization does not create cities from nothing" (Purcell, 2002, p. 148), but rather industrialisation speeds up the urbanisation of cities, and that the city is the perfect context in which industrial capitalism can develop.

3.6 - Northern Cape in Context

The Northern Cape has always had a relationship with mining, dating back to the stone age. In more recent history it was the site of the diamond rush when diamonds were discovered in 1866 (Cape Town Diamond Museum, 2017). Since then mining has continued in the province, and now other minerals are also mined. These include Diamonds, Iron ore, Gypsum, Manganese, Copper, Silver and Zinc. Today there are 242 active mines in the Northern Cape with many others having been closed for various reasons. (Department of Mineral Resources, 2011)

The Northern Cape faces the continuous issue of Fracking and Shale Gas. Whilst there are obvious benefits to the economy and also to local communities, there are also negative effects of fracking. Most notably the effect on the environment. Fracking can lead to contamination of ground water. The Northern Cape is already a water scares landscape and the possibility of contaminating ground water that supports surrounding communities is a major risk. On top of that fracking is a water intensive process, more than 90 percent of water used in the fracking process does not return to the surface. Meaning that this water is essentially taken out of the natural water cycle. Fracking in the Karoo could lead to environmental issues as well as possibly causing more unsustainable towns to develop only to fail when the fracking operations either cease or move on to different sites. (Evensen, et al., 2014, pp. 130-136)

The newest industrial development in the Northern Cape is the development of the IPP industry. Solar farms are the most prevalent form of renewable energy production in

the Northern Cape. These projects, through community funding programmes, create opportunities for local communities to develop into sustainable resilient towns.

3.7 - Understanding Sustainability and Resilience

3.7.1.1 - Understanding Sustainability

The theory of sustainability is by no means a new concept. It has been around for many decades and in itself is quite complex due to its many facets and the fact that there are so many different types of sustainability. However, the theory of resilience is a fairly new concept. Nevertheless, it is integrally linked to the concept of sustainability as resilience is a precondition that must be met before sustainability can be achieved. Urban resilience can be defined as “the capacity of cities to function so that people living and working in cities – especially the poor and vulnerable – survive and thrive no matter what shocks and stresses they encounter” (Rockerfeller Foundation & ARUP, 2014). Resilience in relation to cities speaks to that city’s ability to adapt to change, or to “bounce back from major shocks” (Harrison, et al., 2014, p. 26).

At this stage it is important to note that sustainability is not limited to sustainable/green architecture or systems, but also refers to the general sustainability of something; its ability to survive and thrive.

As noted there are many different facets to sustainability and therefore to creating it, especially within the context of creating sustainable cities or towns. There are four main pillars of sustainability, namely, Social Development, Economic Development, Environmental Management and Urban Governance (United Nations, 2017, p. 62).

3.7.1.2 - Understanding Sustainability – Social Development

The major components of social development, education and health, food and nutrition and water and sanitation. All of these components speak directly to the physical

necessities that a community requires. They are a prerequisite to creating sustainability in cities or towns. They are the most basic things that people need if they are to survive.

3.7.1.3 - Understanding Sustainability – Economic Development

The most important aspect of Economic Development is the creation of decent long-lasting and stable employment. Without this food, nutrition, education and health are hampered and therefore affect the resilience and sustainability of the community.

3.7.1.4 - Understanding Sustainability – Environmental Development

Environmental Development is important to understand that is such it is literally looking after the environment in which we exist and survive. If that environment becomes too difficult in which to survive then there is no form of sustainability. Elements of environmental development include, forest and soil management, mitigation of climate change, recycling and waste management, water management and energy efficiency. These elements highlight the 'green' aspect of sustainability.

3.7.1.5 - Understanding Sustainability – Urban Governance

The elements of urban governance are reduction in inequalities, strengthening of civil and political rights and planning and decentralisation (United Nations, 2017, p. 62). All of these elements create the four main pillars that are required to create sustainability in cities and towns.

3.7.2 - Understanding Resilience

As with sustainability, resilience is inherently complex and multi-faceted. Resilience can speak to; economic resilience, ecological resilience, the resilience of governance,

resilience of the urban form, as well as fabric and resilience of the infrastructure (Harrison, et al., 2014). Key principles of resilience are the capacity to learn, diversity, self-sufficiency and connectedness and redundancy. These relate to all the aforementioned types of resilience.

For anything to be resilient it needs to have the capacity to learn, to understand what the situation is. There must be an ability of the entity to identify and acquire information and knowledge. Resilience requires that there be an interconnectedness that allows for knowledge to be shared between the different levels of governance, or whatever other structure is in question. (Harrison, et al., 2014). The capacity to learn includes the ability to adapt to shocks.

Redundancy entails that there needs to be several components, that can perform the same function. Should one component fail, there must be another, which can replace the first and perform the necessary task. In this way it ensures that a system has a greater reliability and is therefore less susceptible to overall failure. This is essentially resilience.

Diversity in resilience is linked to the idea of redundancy, however unlike redundancy diversity speaks to the notion that a variety of components must be able to perform the same functions differently or must be able to perform a different function. Again, this means that a system is still able to perform when one of its components fail. Therefore, redundancy and diversity make up a big part of resilience.

The final principle is that of self-sufficiency and connectedness. This principle speaks to the entity's ability to self-regulate and selfheal, to use a network to support itself. (Simonsen, et al., 2015, p. 6) states that a "well-connected systems can overcome and recover from disturbances more quickly, but overly connected systems may lead to the rapid spread of disturbances across the entire system so that all components of the system are impacted".

3.8 - IPP's and Development Opportunities

It must be pointed out that the Department of Energy (DoE) views the IPP industry as an opportunity for Socio-economic development (SED) and enterprise development (ED). And not only as a way of solving the country's power security issues. There has been a shift in the country's energy landscape towards renewable energy and partially away from fossil fuel energy. (WWF, 2015)

Throughout documentation on Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) there is very little guidance as to what the DoE requires from bidders in terms of a SED and ED strategies and plans (WWF, 2015). Although there are some basic requirements that are put forward by the DoE there is very little as it relates to detail. In 2011, the DoE gave minimum threshold targets for local employment, South African national employment, ownership, of which part is Black Economic Empowerment (BEE) ownership and part is community ownership. The percentage of project revenue that must be spent on ED and SED (WWF, 2015). However, these figures have not been updated or revised since then. The SED and ED expenditure (1-1,5% of project revenue over the 20-year lifespan of the project) is to be used for communities that are situated around the sites of the IPP plants.

One of the major points of contention throughout the papers reviewed is who decides who should be a recipient of this SED and ED funding? The requirement given by the DoE is that communities with a 50km radius of the IPP's location are eligible for funding (Eberhard, et al., 2014). However, this type of requirement poses its own set of issues. What if half of a community lies within the 50km radius? Does only one half of the community receive funding? The 50km radius may mean that eligible communities are spread across different wards, municipalities, provincial boarders or even national borders (WWF, 2015). As we have seen previously drawing these types of boundaries when it comes to funding can create problems within a community. An example of this is the protests in Khutsong, where the community protested the fact that their municipality was being reassigned to the North-West province from Gauteng province.

Two of these reports give predicted values for money that will be given to community trusts over the 20-year lifespan of the 64 approved IPP projects. The first puts the

value at R1,17bn (WWF, 2015), where the other puts the value of the investment at R29,1bn over the 20 years with an average per annum pay-out of 1,455bn (Baxter, 2015). There is a massive discrepancy between these two values and it is difficult to work out how these values have been calculated. Further research and information is needed to determine which one of these values is more accurate.

The same can be said of the estimations for job creation from IPP's. Naturally the number of temporary construction jobs is far greater than the number of operational jobs that will be created by IPP's. But again, it is difficult to work out how these figures are reached and what is their accuracy (Baxter, 2015).

"*In 2011, the DoE gazetted the Integrated Resource Plan (IRP2010) an electricity supply plan that proposed 42 % of new electricity capacity initiated between 2010 and 2030 must be generated from renewable energy"* (McDaid, 2014, p. 10).
The reason for this policy shift was South Africa's voluntary pledge in Copenhagen to reduce carbon emissions. (Eberhard, et al., 2014). However, despite the success of IPP's in South Africa the DoE has capped the percentage of power that can be produced by renewable energy producers, as well as capping the megawatt (MW) production per type of renewable energy source. Many within the industry have questioned why the DoE has capped the renewable energy sector with what seems to be arbitrary constraints. Some have even suggested that the reason for this is political pressure from international partners. (McDaid, 2014).

Another issue that is brought up in these papers is the issue of governance, at all levels, national (DoE), local municipalities and trust fund governance. The DoE, by their own admission have found the bidding process to be overwhelming. (McDaid, 2014). It seems that they do not have the capacity or the expertise to manage the bidding process. Especially when it comes to the SED and ED portions of the bid. Bidders have stated that they "are not given guidance from DoE as to how to develop their socio-economic plans and have received no feedback on the community benefit part of their projects, leading to less inclination to do anything beyond minimum compliance" (Tait, Wlokas, & Garside, 2013 cited in McDaid 2014). Bidders have suggested that "the procurement process could create better incentives for more ambitious approaches through the scorecard and points system" (Tait, et al., 2013).

Only one of the papers reviewed gives a proposed breakdown for SED and ED spending.

Education	40%
Social and Welfare	11%
Infrastructure	11%
Healthcare	3%
Management and Planning	8%
Enterprise Development	20%
Unallocated	7%

Table 1 – SED and ED spending breakdown (Department of Energy, 2015, p. 42)

The problem that has arisen from mining houses SED and ED schemes is the way in which the money is managed and disseminated to community trusts and how it is spent once it is in these types of trusts (Siyobi, 2015). Its seems that the values of these SED and ED projects are not in line with the Rand value. This is mostly due to governance issues and the structures that allow for them (GreenCape Workshop , 2015).

This project is looking to explore funding structures which can allow SED and ED projects from IPP's to have the best effect on the communities and not to have money wasted on projects that the community does not need. IPP bidders have proposed 7 different models for funding structures, some of which use 'traditional' community trust funds and some of which make provision for new models.

Scheme	Main Characteristics of Scheme
1	SED and ED are channelled into local ownership trust
2	SED, ED and local ownership are channelled into 3rd party entity
3	SED, ED and local ownership are externally managed and monitoring is coordinated
4	In-House capacity is built to manage spends and trust dealings
5	(Local) Government or FET colleges close partner for SED
6	ED Enterprise to be established
7	NGO is chosen as major local ownership partner

Table 2 – Community benefit schemes identified in bid documents. (WWF, 2015, p. 27)

The literature does not single one of these methods out as the best or even give an indication of which might be best in practice. More research is needed for any conclusions to be drawn from these different schemes.

Sustainability Theory suggests that sustainable development is, “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (United Nations, 2017). However, in South African mining towns this is most often not the case. There are no considerations made for post-mining existence. SED and ED development that is being done is not aimed at a post-mining existence.

As with sustainability, resilience is inherently complex and multi-faceted. Resilience can speak to; economic resilience, ecological resilience, the resilience of governance, resilience of the urban form, as well as fabric and resilience of the infrastructure (Harrison, et al., 2014).

Urban resilience can be viewed as a precondition of sustainability. Where sustainability is the goal and resilience is a method for attaining that goal. If a city is not resilient i.e., doesn't have the ability to survive shocks and continue to function, then it cannot be sustainable. Sustainability speaks to a certain programme that needs to be followed to attain a sustainable status. As it stands mining towns, such as Kathu, are neither sustainable nor resilient. Kathu does not have the ability to survive a major shock, such as the cessation of existence of the iron ore mine.

Chapter 4 - Understanding SED and ED funding models in relation to mining towns – Status Quo

4.1 – Legislation

To understand how IPPs can differentiate from current mining protocols on SED, ED and community funding, one needs to understand exactly what these protocols are, how they are implemented and their shortcomings.

Initially one must understand the legislation that is prescribed by the government. Mineral and Petroleum Resources Development Act 28 of 2002, Code for The Good Practice for The Minerals Industry states that all mines must put forward 1% of after tax net profit towards mine community and rural development (Department of Mineral Resources and Energy, 2002). Rural development encompassed socio-economic development (SED) and enterprise development (ED). Failures by mining companies to implement this practice are subject to fines and cancellation of their mining licenses.

Whilst the percentage of after tax net profit stays constant at 1%, the manner in which this money is utilized and distributed is not fixed. Many mining companies have set up community trusts, community foundations or community funds, that manage the money, and in theory use it for the best interests of the community, through infrastructure, skills, socio-economic SED and ED programs. However, community trusts are not without their own shortcomings, and often governance issues mean that money is not spent most effectively, for the greatest good of the community. An example of governance issues that plague community trusts is members of the community claiming to be the elected representative of the community without having been voted for or appointed as such. This is especially prevalent in communities where the language of the community is not the language in which the community trust is being managed. (Harvey, 2017)

4.2 – Current Mining Charter

The current Mining Charter of South Africa legislates that 1% of post-tax net profit of the mining company must be used for community development, which includes SED and ED. According to the charter mining companies are required to conduct assessments of the needs of mining communities with relation to SED and ED. The companies then have to contribute towards community development that is in line with Integrated Development Plans (IDP). However, mining companies do not possess the skills and knowledge to efficiently develop strategies for community development that is sustainable and best meets the direst needs of the community. This process is also not helped by the structures that are used to integrate the communities into the decision-making process.

4.3 – Funding Structure

There are several different forms of fund that mining companies set up for the distribution of the 1% of post-tax net profit. Whilst essentially, they seek to accomplish the same task there are differences in terms of structure and legal responsibilities. The first type of entity is a foundation, which can be defined as an "institution used for charitable or family purposes" (Wall & Pelon, 2011, p. 20). Foundations are comparatively flexible in the undertakings they may conduct. They are separate legal entities that have ownership of the assets that they control. Most often they are managed by a board of representatives, who have a duty to act within accordance with the mandate, and best interests of the foundation. However, these duties are less demanding than that of a Trust. (Wall & Pelon, 2011)

Community Trusts are another way of managing funding. A community trust is a relationship between the trustees, settler of assets and the beneficiaries. The board of trustees is allocated unambiguous duties, and because of this it can make a trust less flexible than a foundation. Members of the board can be held directly responsible for their managerial decisions; they are required to exercise an "all responsible care" mandate. This is a stronger binding legal concept than used in a foundation or a fund. Community Trusts have lesser public domain requirements than foundations and funds. (Wall & Pelon, 2011, p. 21)

A community fund is the most simplistic type of mechanism; it is more a definition than an actual entity. It can be legally defined as a foundation, trust or a designated line item within a company's budget. (Wall & Pelon, 2011)

Each one of these mechanisms follow two main funding structures. The first, endowment funding, is best suited for Foundations, Trusts, Funds (FTF's). The second structure is annual budget allocations. Some institutions use a combination of the two. In general Endowment funding is structured to exist past the life cycle of the mine. This differs from annual budget allocations in the sense that they are designed to exist only for the duration of the mine's life. Therefore, by definition annual budget allocations do not create long lasting sustainable development for the community. It would therefore be even more vital for companies using annual budget allocation funding to select the most effective development projects and programs that will create the biggest benefit past the mine's life.

4.4 - General Challenges Facing Community Entities

Challenges that are faced by community trusts, foundation or funds are varied depending on the specific structure, the specifics of location and the community, which they serve. The first issue that can arise is ensuring the independency or autonomy of the trust, foundation or fund. The structuring of the community entity is also vitally important to the success or failure of the entity and the projects it initiates. The composition of the governing board is also very important, as an incorrect appointment of trustees can severely hamper the work of the entity. A chief concern when appointing trustees is the level of education they have (Industrial Development Corperation, 2016).

The Industrial Development Corporation (IDC) has indicated that they will take a more active role in the selection of trustees for projects that they fund. Subsequently they have developed a standard for selection of trustees. This standard includes the requirement that candidates possess a university qualification. The principle behind

this is that trustees who have a higher level of education will then be able to have a better understanding and ability to develop management skills that will be serve the trust, fund or foundation. (Kiragu, et al., 2016, p. 21)

Another issue that can affect community trust, funds or foundations are; corporate governance and distribution of benefits. Whilst the fund, foundation or trust holds the money in its legal capacity, issues can arise when it comes to distribution of funding to beneficiaries. There can also be issues with the distribution of other forms of benefit, depending on what form they take. Incorrect identification of community projects can result in the community not receiving the development it most needs. Often this can be due to external causes such as bribery, manipulation of contracts, collusion or projects being hijacked by politicians, local government or opportunists (Industrial Development Corperation, 2016).

4.4.1 - Specific challenges that face REIPP community trusts, foundations or trusts

When it comes to specific challenges faced by Renewable Energy Independent Power Producer (REIPP) community trusts, foundations or funds they are characterized by three major deficiencies. A lack of understanding of the community funding mechanism, a lack of well-developed strategy and a lack of good governance. When one breaks these categories down further one finds that there is a lack of definition with regard to the roles of the various stakeholders (NGO's, CBO's, private companies, traditional councils, provincial government and municipal government). Planning is not sufficient in terms of a community engagement plan or with communication channels or plans. These types of issues inevitably lead to community infighting, chieftaincy conflicts and boundary disputes (Industrial Development Corperation, 2016).

As the DoE does not propose a model, schedule or process for IPP's to follow when setting up community trusts further complications arise. This means that the IPP's legal representatives set up the structures of community trusts. This in truth means that the

financiers (IPP's) are responsible for financing the setup cost of the community trusts. (Kiragu , et al., 2016)

Community trusts, foundations and funds often suffer from a lack of vision and find it difficult to define clear well thought through goals. Due to the lack of definition in terms of the roles of various stakeholders/trustees there is a lack of clear strategy. This can very easily lead to incorrect selection of community projects. There is also very little guidance from the government on how to drive community development (Industrial Development Corperation, 2016). There is very often an overlapping of the responsibilities and mandates of various trusts that may serve the same areas. There is no centralized management plan that allows other trusts to see what programs and initiatives are already being implemented or are planned. This means that two trusts could be working simultaneously on similar projects. It would serve the community better if trusts could collaborate to develop the most effective interventions.

4.4 – Proposed New Mining Charter

The proposed new mining charter III updates requirements in ownership, procurement and enterprise development, employment equity, human resources development, mine community development and housing and living conditions.

As previously stated mining companies are required to put forward 1% of post-tax net profit to community development. The new charter proposes that this figure be changed to 1% of annual turnover. The charter also revises the figures with relation to procurement and enterprise development. All South African mining companies must utilize local analytics services for all mineral samples.

The mining companies must also procure from BEE entities. 80% of services compared with 70% in the old charter. 70% of mining goods compared to 50% in the

old charter. Multinational suppliers of capital goods must now contribute 1% of their annual turnover to a Social Development Fund.

The new mining charter also proposes that all mining community trusts will be managed by a “yet to be constituted Mining Transformation and Development Agency (Webber Wentzel and Associates, 2017)”

4.5 – Proposed IPP Requirements

From the beginning it was envisaged that the IPP’s would be required to meet the same or similar requirements as mining companies, with regards to community development. However, there has been concern from the IPP’s that the structures, implementation and success of community development programs by mining companies are not effective or efficient for various reasons, which have been highlighted above.

Through the Renewable Energy Independent Power Producer (REIPP) Request for Proposals (RFP) processes the following criteria was specified by the Department of Energy (DoE), for proposers to adhere to. See Figure 1

	ECONOMIC DEVELOPMENT ELEMENTS	MINIMUM THRESHOLD	MAXIMUM THRESHOLD	DESCRIPTION
1	Job creation - SA citizens	Various indicators		Number of jobs held by local citizens
	Job creation (Local Area)	12% of RSA employees	20% of RSA employees	
2	Local Content	Differs by Technology		This refers to yjr apital costs and costs of services procured for construction minus the finance charges, land and mobilisation fees of the contractor, (DoE, 2011b).
3	Ownership (Overall black ownership requirement)	12% of project shareholding	30% of project shareholding	The percentage of company ownership measured through shares and other instruments that provide the holder with economic benefits such as dividends or investment payments, (DTI, 2004).
	Ownership (Overall community ownership requirement)	2.5% of project sharholding	5% of project sharholding	
4	Management Control	0	40%	The effective control of the company with reference to 'too management' (DoE, 2011b).
5	Preferential Procurement	Various indicators		The procurement of goods and services from suppliers that are BBBEE compliant.
6	Enterprise Development (ED)	0	0.6% of Project Revenue	Supporting the development and sustainability of black-owned businesses.
7	Socio-Economic Development (SED)	1% of Project Revenue	1.5% of Project Revenue	Financial contributions to socio-economic development initiatives that promote access to the economy by black people.

Figure 1 - Table showing the Economic Development criteria of the REIPPP in the first issue of the Request for Proposals (RFP) in August 2011- DoE 2011

The most noticeable difference in the requirements for IPP's and mining companies is that IPP's will be required to put forward up to1,5% of project revenue for SED, instead of 1% of post-tax net profit. Additionally, IPP's will have to put forward up 0,6% towards ED. This is much more than the combined 1% put forward by mining companies for both SED and ED.

Chapter 5 – The role that IPP's can play in SED and ED in post-mining towns

5.1 Mining Towns – Status Quo

Mining Towns or Company Towns are settlements that have been set up by mining companies, often very quickly, to house both mineworkers and mine management. Often the mining company would buy up all the land that the town was to be situated on, normally close to the mining operation, and would build the town from scratch. All the structures and infrastructure would be owned by the mining company and housing lent to its employees. Because the mining company essentially owned the entire town they had a certain amount of autocracy over it and ran the town as they saw fit. All activities in the town were provided by the company; depending of your level of importance these might include establishments like golf courses and bars. As the mining company 'owned' the town they could even prescribe who was and was not allowed in the town. To a certain degree this practice has stopped but there are still some towns that have this level of security, specifically diamond mines.

Once a mine closed or became less profitable, and it did not make economic sense to own the whole town, most companies then sold off houses to workers. Over time or if the mine closed very often the people who then owned the houses no longer worked on the mine.

Mining companies enjoyed a monopoly over these towns and therefore did not allow or create any alternative industry in these towns. Essentially isolating them from the outside world, and catastrophically limiting their sustainability and resilience. Mining towns are inextricably linked to the fortunes of the mines they serve, hence why they are so susceptible to failure.

South African Mining towns are in decline and there is now cause for serious concern regarding the sustainability of these towns. There is a real possibility of many mining towns becoming ghost towns as has happened previously on the west coast of South Africa, Namibia and even on the Transvaal gold belt.

5.2 – Reasons for mining Town Failure

The biggest reason for the decline of mining towns is mine closure, which is an international phenomenon. Mine closures occur for various reasons. The fall of global commodity prices, domestic cost pressures have risen too quickly (electricity prices and wages), uncertainty over the government's mining policy and a fall in productivity of mines (viability) (Baxter , 2016). Due to the fact that most, if not all 'mining/support' town's revenue is created or linked to the mine, if the mine closed it essentially spells the end of the mining town.

Because mining towns and the mines they support have, up until this stage, been very lucrative, there has been no need for residents to diversify, or develop alternative streams of income. The mining companies see no reason to invest in infrastructure that doesn't directly benefit the mine or meet minimum legislative requirements.

Mining towns exist under the natural monopoly of the mining company. This is most often due to the remote location of the mine, meaning that the majority of residents of the mining town were drawn to the site because they have jobs on the mine. Some mine workers dependents relocate with mine workers; however, this mostly happens with mine managers and upper levels of employees. The lower levels of employees are migratory, living in the towns for most of the year and travelling home once a year over the holiday period.

The situation suits the mining companies because they do not have a competition for the labour force of the town. They are able to have a certain degree of autonomous control over the community. Similarly, due to the fact that the community trusts rely solely on the mining companies for funding, and often have mine company staff sitting on the relevant governing structure, they have control of how money is spent. This is especially true when local community members of the governing structure can be swayed or influenced.

5.3 – IPP SED, ED and Community Trust Funding Models

There is a misconception around IPP and community funding. Most people believe that all SED and ED funding is given to a community trust and then utilized by that trust for SED and ED, however this is not true.

IPP's have a responsibility to use between 1 and 1,5% of project revenue for SED and up to a further 0.6% of project revenue for ED. This is money that the IPP has to spend. In conjunction with this the IPP has to set up a separate community trust for the local community (within a 50km radius, as prescribed by the DoE). The community trust has a minimum of 2.5% with a standard of 5% ownership in the project. This means that the community trust is paid 2.5 – 5% dividends of the profit share. However, in the early stages of the project the profit share goes towards repaying debt, the IPP will employ a 'trickle down' model.

Whilst the debt is being repaid the 1-1.5% of SED and ED funding by the IPP is far greater than the profit share that the community trust receives. However, over time the profit share starts to catch up with the 1-1.5% IPP spend and once the project is debt free the community trust fund profit share will overtake the IPP spend. The IPP SED and ED funding (1-1.5%) will continue for the duration of the project life and will remain constant, whereas the community trust dividend will grow over the lifespan of the project. (Department of Energy, 2016)

Figure 3, on page 52, shows the Community Trusts Net Income, for IPP stages 1,2 and 3, will be R29.1 Billion over the IPP's lifespan (2037). The figure also shows the nature of the 'trickle down' model employed by the IPP's, where the maximum pay-out will occur between 2029 and 2033. (Department of Energy, 2016)

Figure 2, on page 52, shows the relationship between the cost vs. income of the community trust. As the debt decreases the community trusts income increases. (Department of Energy, 2016)

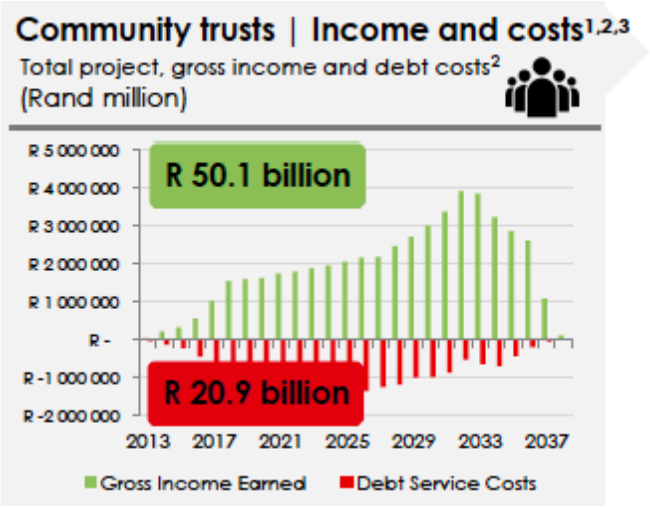

Figure 2 – Diagram showing IPP Community Trust income vs costs over the project lifespan (Department of Energy, 2016).

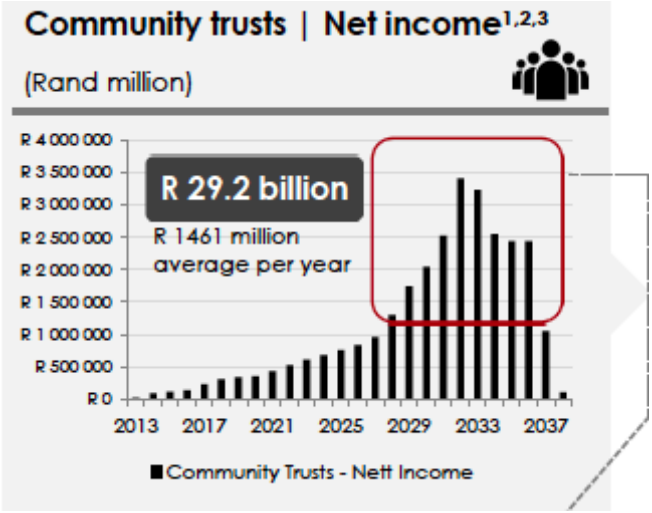

Figure 3 – Diagram showing IPP Community Trust net income over the project lifespan (Department of Energy, 2016).

5.3.1 Breakdown of SED and ED Spending

The activity spread for all the existing South African IPP's is broken up into 5 major categories; education and skills development, social welfare, health care, general administration and enterprise development. The majority of money is spent on education and skills development (43%). This is followed by enterprise development (23%) and social welfare (22%). general administration (7%) and health care (4%) makes up the difference. (Department of Energy, 2016)

The percentage spent on education is nearly double the amount spent on enterprise development., this despite the fact that enterprise development is one of the seven key criteria put forward by the REIPPP (See Table 1). There are certain reasons for this, the first being that early development programs have been placed under the education and skills development umbrella. (Department of Energy, 2016)

5.3.2 Governance Schemes for Community Funds

Through the third stage of the procurement program IPP bidders have proposed 7 different models for funding structures, some of which use 'traditional' community trust

funds and some of which make provision for new models. They all have their own positives and negatives.

Scheme	Main Characteristics of Scheme
1	SED and ED are channelled into local ownership trust
2	SED, ED and local ownership are channelled into 3rd party entity
3	SED, ED and local ownership are externally managed and monitoring is coordinated
4	In-House capacity is built to manage spends and trust dealings
5	(Local) Government or FET colleges close partner for SED
6	ED Enterprise to be established
7	NGO is chosen as major local ownership partner

Table 3 – Community benefit schemes identified in bid documents. (WWF, 2015, p. 27)

The literature does not single one of these methods out as the best or even give an indication of which might be best in practice. More research is needed for any conclusions to be drawn from these different schemes. The government has indicated a level of flexibility for economic development plans, and this paves the way towards for a hybrid scheme to deliver the best results. (WWF, 2015, p. 27)

5.4 – How can IPP Funding Change the Status Quo in a Post-Mining Era?

It must be pointed out that the Department of Energy (DoE) views the IPP industry as an opportunity for socio-economic development (SED) and enterprise development (ED). Not only as a way of solving South Africa's power security issues, but also in the upliftment of communities. There has been a shift in the country's energy landscape towards renewable energy and partially away from fossil fuel energy. (WWF, 2015)

Throughout documentation on Renewable Energy Independent Power Producers Procurement Program (REIPPPP) there is little guidance as to what the DoE requires from bidders in terms of a SED and ED strategies and plans (WWF, 2015). Although there are some basic requirements that are put forward by the DoE there is very little as it relates to detail. In 2011, the DoE gave minimum threshold targets for local employment, South African national employment, ownership, of which part is Black Economic Empowerment (BEE) ownership and part is community ownership and the percentage of project revenue that must be spent on ED and SED (WWF, 2015). However, these figures have not been updated or revised since then. The SED and ED expenditure (1-1,5% of project revenue over the 20-year lifespan of the project) is to be used for communities that are situated around the sites of the IPP plants.

The DoE provides very little in the way of guidelines as to how SED and ED funding should be spent, or the manner in which projects need to be selected for the best possible results for the designated community. Because of this lack direction IPP's are required to formulate individual community fund governance models, as shown in Table 3, pg.53. This means that the first rounds of IPP SED and ED community funding models are essentially trial and error

IPP's provide the possibility for significant funding for SED, ED and Community Trust funding. This funding comes with far fewer 'strings' attached than the equivalent Mining industry funding. The IPP funding is not restricted, like the mining industry funding, because the IPP's are supporting the development of alternative industry in the local environment.

Chapter 6 - How IPP SED and ED funding can develop a new typology of architectural firm that can become an agent for social change?

6.1 – Understanding business models

Firstly, it is important to understand the significance of the business model concept, in that it is a guiding set of principles that represents the way the leadership of the company expects the company to run. The business model can be viewed as "the rationale of how an organisation creates, delivers and captures value" (Osterwalder & Pigneur, 2010, p. 14). Another definition by Afuah and Tucci is;

"A business model is the method by which a firm builds and uses its resources to offer its customers better value than its competitors and make money doing so. It details how a firm makes money now and how it plans to do so in the long term. The model is what enables the firm to have a sustainable competitive advantage, to perform better than its rivals in the long term." (Afuah & Tucci, 2001, p. 9)

A business model as a non-tangible entity, can be either complex or simplistic. There is no guide for which business model a company should use. Various business models can be combined to create the most effective solution for each individual company. In today's complex business market innovative business models are starting to become the most successful strategies. Examples of these types of companies are Facebook, AirBnB and Uber. Facebook is the biggest news broadcaster in the world but produces none of its own content. Air BnB is the biggest accommodation provider in the world yet they do not own any real estate. Uber is the biggest taxi service in the world but they do not own any taxis. These are examples of companies using innovative business models to create hugely successful companies.

Having a strong business model is critical to being able to develop a company within any specific industry. A business model relates to all aspects of a company; financial

aspects, customer interface, business infrastructure and value proposition. These categories can be broken down further. See Figure 4 (DuPont, 2014)

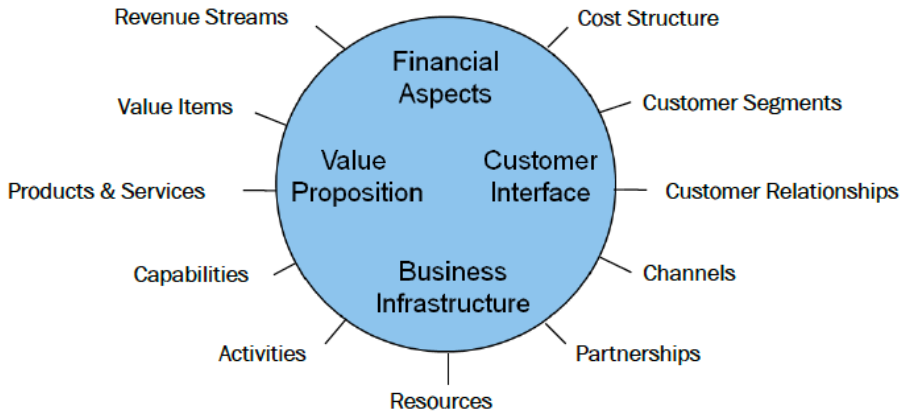

Figure 4 - Diagram showing the different aspects of a business model (DuPont, 2014)

6.2 - Current Architectural Model

Currently most architectural firms utilise a basic business model called a Business to Consumer Model. This is defined as a company that provides its consumer with a service or product. When it relates to architectural firms they can be selling both a design service and a product, or just a design service.

Due to the capitalistic nature of today's business market all companies are trying to extract as much value out of their product or service as possible. There are two ways to do this. The first is by using volume, relatively small amounts of profit per item or service but with substantial volume. This allows a company to have high profits. The second way of creating high value is by using a Premium Business Model. In this model the company offers a high-end product or service to the discerning consumer. The profit margin on these products or services is much larger but the sales volume is much lower. These types of companies rely on a very strong brand image. and marketing scheme They often serve a very small niche in the market. Examples of this are Rolls Royce or Rolex.

Architectural firms can work in the same way, by having a very small niche market and completing relatively small quantities of work but having high profit margins on those completed works. For example, an architectural firm may specialise in high-end houses on the Atlantic seaboard in Cape Town. These houses are very expensive and the architectural firm charges a higher than normal commission rate. They do not build many of these houses each year but the profit margin on each home is very large.

6.3 - Shortcomings of the Current Architectural Model

There are several reasons why architectural firms fail. The first and biggest reason is that the company does not have a well thought out business model or plan. This means that the firm fails to have a clear understanding of the product that they are trying to create for the client and how to achieve it.

When it comes to community projects, such as the Dingleton resettlement project (Kathu), it is difficult for the firm to determine who is the most important stakeholder in the project. Is the community the most important stakeholder or is the client the most important stakeholder? It can be very difficult to design when the entity paying for the project is not the end user of that project. In these scenarios the architect can become torn between the stakeholders and those whose requirements are primary.

Unfortunately, due to the nature of the industry, when it comes to community projects, far too often the primary requirements are controlled by the client who is responsible for funding the project rather than to the community that the project is meant to serve. When this happens the end, product can often become something that does not reflect the main requirements for the community that the buildings are mean to serve.

6.4 – How does IPP Funding Differ from Mining House Funding?

Whilst the intention of both the IPP, SED and ED funding and the mining house SED and ED funding is the same, there are some differences in the way that this money is being used. There is also a difference in the potential of the two funds. Whilst mining funding is a small percentage of a very large turnover, IPP funding is handled differently. As there is a capital outlay for the IPP, which is funded mostly by financial

institutes, like the Development Bank of South Africa (DBSA), there is a debt that has to be repaid. This means that whilst, the community trust has a stake in IPP, that they are responsible for part of this debt. This repayment structure determines the level of funding that is available to the community fund. Most of the IPP's have set up trickle down funding structures. As well as the legislated quarterly SED and ED percentage that they are required to spend. (WWF, 2015)

A trickle-down structures mean that the community receives only small percentages of funding whilst the debt is being repaid. Once the debt is repaid the community fund then receives the full share of their ownership percentage. The SED and ED funding from the IPP remains constant at a minimum of 1% of project revenue. This means that in the initial years of the project the IPP funding is far greater than the community ownership share, however as time moves forward the community ownership share becomes more than the IPP funding. See Figure 5 below. (WWF, 2015)

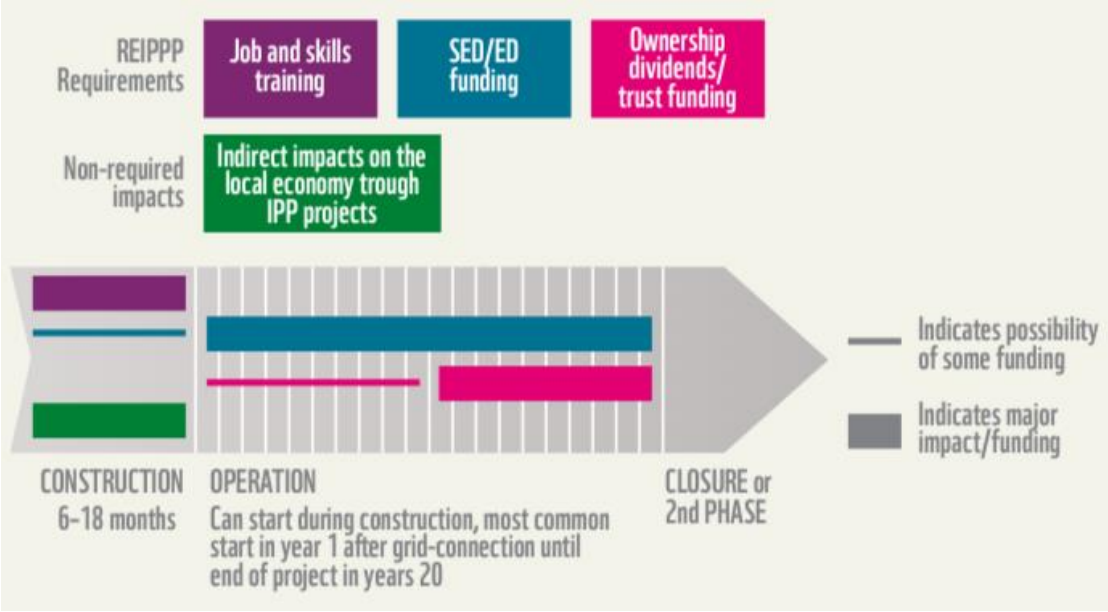

Figure 5 – Diagram showing IPP Project phases and timing of local economic benefits (WWF, 2015, p. 23)

It is very difficult to say how much money mining houses are spending on SED and ED programs because there is no legislated percentage and they all have different ways of reporting SED and ED spending in their respective financial reports. the World Gold Council estimates that the gold industry spends 0.9% of gold sales on community

investments. (The World Gold Council admits that the basis for this figure comes from a very small sample, and therefore it's accuracy cannot be guaranteed). This is spent on a variety of different 'focus' areas; see Appendix D, Figure 7 (World Gold Council, 2015). This differs from the IPP industry where the required SED and ED spend is clearly laid out, as a minimum of 1% of project revenue for SED. (Department of Energy, 2016)

The IPP industry through the first three stages of procurement has already allocated significant funding to SED and ED.



Figure 6 – Diagram showing Funds allocated to local community development after the first three procurement rounds. (WWF, 2015, p. 22)

However, there is a limitation of the IPP's SED and ED funding. This is because they are required to spend their SED and ED budget quarterly. Owing to this they are struggling to fund bigger projects that could be more effective in the community. Unlike the mining houses they do not have the massive capital to be able to fund big development projects (WWF, 2015, p. 22).

6.5 – How can this funding be used by a new typology of architectural firm?

The IPP industry is by nature, more sustainable and socially responsible than mining companies. This means that they are far more likely to develop projects that will serve the best interests of the community. The vast majority of Community Social Investment (CSI), including SED and ED funding, in South Africa is “motivated by license-to-operate arguments, rather than being underpinned by moral convictions” (WWF, 2015, p. 23).

IPP’s are also less land intensive than mines and do not require large workforces to keep them operational. There is also very little chance of IPP’s requiring new land (expansion) and therefore it is not necessary to develop relocation projects such as the Dingleton Relocation Project, conducted by Anglo American in Kathu, Northern Cape. This means that IPP SED and ED development projects are more permanent than mining projects. IPP’s also have a longer lifespan than mines and do not depend on a non-renewable mineral that will become depleted. The renewable energy industry is a more stable and sustainable one, in comparison to the mining industry, which is by definition unsustainable and is at best, fairly unstable, especially in a South African context. (ED Platform, 2018)

All of this means that communities that surround IPP’s (within a 50km radius) can expect them to be there for a very long time and can therefore also expect funding from them for a very long time. This stability is a positive for the community as well as for architects trying to create sustainability through SED and ED projects. Whilst the trickle-down structure means that initially there will be relatively little money available from the community fund there will be funding available from the IPP itself, meaning that development projects can start as soon as an IPP becomes operational.

Whilst it is important for the ‘Project Company’ (mining house or IPP) to have an input into the projects that are selected, it is more important for the community, through the community trust to have a major input. Previously architectural firms have been hired by the ‘Project Company’ and end up producing products that mostly benefit the

‘Project Company’’ PR department more than the intended community. Because the ‘Project Company’ has employed the architectural firm, the firm and its products are beholden to the ‘Project Company’ and not to the community itself. Project selection can also become problematic when handled by the board or a senior manager of the ‘Project Company’ because of a bias towards ‘pet projects’.

The ‘New Architectural Firm’ typology could deal with several of the issues faced by the traditional structures. Firstly, this ‘New Architectural Firm’ could be directly employed by the community trust, on a contract basis rather than a project by project basis, as both development partners as well as community trust managers. The ‘New Architectural Firm’ should be embedded in the community over time creating a longer lasting relationship and understanding of the community and its needs. Consequently, this would lead to greater trust between the community and the ‘New Architectural Firm’, leading to more meaningful interventions. Being employed by the community trust rather than the ‘Project Company’ means that the ‘New Architectural Firm’ would not be beholden to the ‘Project Company’ but rather to the community. The ‘New Architectural Firm’ would be more socially responsible than the ‘Project Company’ and therefore have the ability to create projects that better reflect the needs of the community that would ultimately lead to resilience and sustainability of that community.

In a direct relationship between the community trust and the ‘New Architectural Firm’ it would be even more important for there to be strong and experienced leadership of the community trust and careful selection of trustees. Some of this pressure would be alleviated by the expertise and guidance of the multidisciplinary ‘New Architectural Firm’.

The structure and makeup of the ‘New Architectural Firm’ is discussed in chapter 7.

6.6 – Architects as Agents for Social Change

In the past decades the architectural profession has marginalised, and to a certain extent relinquished its social obligation. This is most likely a result of the capitalist

society, economic crises and the competitive nature of workplace the profession finds itself in (Rivad, 2006).

Architectural firms are struggling to survive and as such when they do have work they seek to extract the maximum amount of profit out of each project that they can, as do all other types of businesses. Because architects most common fee structure is percentage based, this means that they look to use the maximum amount of budget that the client has, so as to maximise their own profit. This is commonly referred to as upselling.

Architectural firms have to have a high sense of corporate social responsibility. They have a duty to their clients but also to the society and also the environment as a whole. "Architects play a significant role towards producing buildings and facilities that save the environment, enhance society and prosper the economy" (Othman, 2009, p. 38). It seems that the corporate structure of South Africa business has devalued the importance of corporate social responsibility and elevated the importance of making profit, sometimes with disastrous effect.

"The whole talk of corporate and social responsibility is wonderful but sometimes good intentions can lead to harmful unintended consequences" (Wood, 2017).

Architects are uniquely positioned to be agents for social change. This is due to the nature of architecture. Architecture is essentially place making, and it affects the vast majority of people in the world. Inversely architecture has always been the result of economic, social and cultural aspects. The relationship between architects creating 'good' architecture and situational circumstances dictating a certain type of architecture are inextricably linked. The architect cannot create responsive architecture if they do not take into account these three aspects. However, the architect has the possibility to alter those aspects through design. This is where the perfect balance lies for architects. (Othman, 2009)

For architects and architectural firms to become agents of social change they first need to accept the role and responsibility that comes with it. For this to happen they need to focus on the following points (Othman, 2009).

- Raising the awareness of the important role that design firms can perform towards improving the society.
- Perceiving stakeholders' requirements and involving them in the design decision-making process to ensure that the developed facilities meet their needs, fulfill their expectations and reduce the cost and implications of later modifications.
- Equipping buildings with facilities for people with special needs as well as health and safety requirements.
- Seeking feedback from people who are affected by the built environment, providing support and adding value to communities and the supply chain.
- Including Corporate Social Responsibility (CSR) in the architectural education programs and providing expert advice to non-experts through offering volunteer services.
- Promoting positive partnerships between the public sector and SAADF to support government initiatives improve collaboration and experience exchanges.
- Offering training programs and jobs for recently graduated architects and engineers as well as sponsoring students.

Chapter 7 – A new Architectural firm – Creating sustainability in post-mining towns in South Africa

7.1 – Understanding the 'Social Pillar' of current Architectural Firms

Prior to the modernist movement there was no major emphasis on development projects, and social upliftment was not a common thread in architectural education or practice. This changed with the development of the modernism movement.

"Pioneering social agenda was one of its most important motivations, and perhaps its most enduring legacy" (Foster, 2002, p. 26)

This shift towards social upliftment started in the 1940's, post-World War Two, and continued through the so-called 'Development Era' up until the 1970's, when development slowed again. However, the theme of social upliftment continued to grow as an architectural principal. (Carter, 2007, p. 1). Despite the fact that these development projects were numerous and many architects devoted large parts of their careers to them, many of them were ultimately failures. Scholars and practitioners have debated ever since the development era as to why these projects failed, and the reasons vary greatly.

One of the outcomes of the failure of development projects in the development era is that in the 1990's there was a major shift as to how these types of projects were managed and controlled, namely from governmental departments to "government funding and toward more partnership-based and government to NGO funding." (Carter, 2007, p. 1). The failure of these projects resulted in the understanding that working with small sized organisations is more effective and also more efficient in terms of product, as well as that in order for development projects to be successful the organisations and the communities that they work in need to be made an integral part of the process, in order to have the capability to improve people's lives and create social change. (Carter, 2007, p. 1)

During the ‘development era’ the vast majority of development projects were controlled and undertaken by various government departments and political regimes wishing to rapidly modernise their countries by remodelling people’s lives. (Khan & Allacker, 2014, p. 16). Examples of these master development projects are the new capitals of Islamabad, Canberra and Brasilia.

In the vast majority of these development projects the architects played the ‘expert’ role, having being, through their education and practice, “equipped with a humanitarian social agenda and professional designation to serve the public interest. Many architects participated in the ‘development decades’ ... only to find that being well-trained and well-intentioned [was] not enough” (Carter, 2007, p. 1).

There is essentially a disconnect between the communities that the designers are designing for and the end product. Hence the production of cities that were supposed to change people’s lives but, in the end, did not have any positive effect on them. Noted architect and theorist Herman Hertzberger explained that “too often the relationship between the building and the story behind it (...) is missing” (1999, p. 7). What he meant by the ‘story’ is the way that that the developer and designer work with the end users of that project. Hertzberger views this relationship as “of paramount importance” (Carter, 2007, p. 2) in creating humanitarian architecture that can stimulate social change. This concept stems from his fundamental principal that an architect’s role is to create spatial frameworks that are then filled by the end users. It is crucial to have this link between end users and designers for any development project to have the chance of creating social change.

All of this suggests that there is not enough knowledge within architectural education or practice to adequately equip architects, as leaders of design driven development projects, to effectively respond and manage the social requirements of communities to create successful social upliftment. It is therefore necessary to adjust the structure of the architectural firm to incorporate persons with the knowledge and expertise to meet these requirements. Hence, the development of the idea of a ‘New Architectural Firm’.

7.2 – The ‘New Architectural Firm’

As discussed in the previous section an intrinsic element of creating successful development projects that can affect social change is that there has to be participation from the intended users. There are several ways of gaining this participation from the intended users. The most commonly used method of gaining community or end user participation is through an interview process. This process can be effective in acquiring rudimentary information, and sometimes that is enough to be able to start designing a project. But when it comes to effecting social change it is simply not detailed or involved enough to give the design the required information to start making the correct decisions, with regard to the architectural product. This is why so many development or humanitarian architecture projects are ultimately unsuccessful. Not only is the process of conducting superficial interviews not enough to actually assist the designer but in almost all cases, an architect, does not have the necessary expertise, knowledge or skill to really get the required input from the community.

For these reasons one of the most effective methods of gaining community participation is becoming embedded within the community. This is a concept that was pioneered by companies such as Rural Studio, which is an off-campus design and build program of the Auburn University, Alabama, United States of America. The principal for this studio was to embed themselves in a community in need and discover the most pressing issues in that specific community and then define solutions that can positively affect the lives of that community for the better. One of the major driving principals of the studio is “what should we build, rather than what can we build” (Rural Studio, 2017). This is a principal that can only be followed by knowing what it is that the community really needs, and the best way to understanding this is to become part of the community.

Rural Studio has become a world-renowned program and has completed many successful development and community orientated projects over its twenty-year history. A large part of this is due to their willingness to embed themselves in the community and to develop projects based on the true needs of that community and not the perceived needs.

Considering post-mining communities, the necessity to become a trusted member of the community is even more vital to the success of development projects. These communities are often wary of outsiders, and because of their dire circumstances they are likely to accept any form of development, even if it is not the development that would best serve as a way of stimulating social change.

It must be understood that in the 'New Architectural Firm' there needs to be a crossover of skills and knowledge. It is simply not possible for architects to shoulder the responsibility of completing all the tasks required to create successful development projects. It is therefore necessary to look to other types of professionals to assist with this, which is something that already happens with joint ventures between architects, engineers and project managers. However, in scenarios such as these, the different disciplines do not fall under the same company structure, and they do not all have the same understanding of the project, or how to best accomplish the goal of creating successful development projects that have the capability to create social change.

It would therefore stand to reason that if all these disciplines could be brought together under one company there would be greater continuity and a greater chance of creating social change. However, in order to best succeed with development projects, the disciplines cannot just be composed of the standard professional team disciplines, but rather needs to include other disciplines that understand and are skilled in accessing and gaining access to information and input from the community that will ultimately supply the necessary building blocks for successful development projects. These added disciplines would include, social workers and sociologists, economists, community members and persons who have experience working in the communities in question. Whilst the team can still be design led and product orientated, architects do not have the skills to accomplish all of this on their own.

As discussed in Chapter 6 the proposed new structure of the contract between the community trust and the 'New Architectural Firm' would allow for designers to innovate and explore new possibilities rather than having to follow a direct brief and produce a product in a relatively short space of time. The designers would be able explore alternative approaches to resolve poignant social issues within the community, rather

than merely producing reiterations of old solutions that haven't worked in other scenarios.

7.3 - Creating Sustainability

A major factor in creating sustainability in a post-mining scenario is selecting and implementing the correct strategies and projects that can create new industry or new means by which people can survive. IPP funded and IPP community trust funded programmes have the opportunity to effect this change through project selection, however there are some challenges to this process.

One of these challenges is a direct result of the structuring of the IPP SED and ED compliance structure. The IPP Office and procurement structure require that IPP's SED and ED spend must be done so in a quarterly structure. Whilst this insures that the IPP's fulfil the legal commitment to utilise the funds, it also limits their ability to fund bigger projects that may have more of an effect in creating sustainability for the community.

There needs to be a mechanism that will allow the IPP's to put forward a plan that can be approved by the IPP office that allows the IPP's to collect money over several quarters. This greater fund can then be used for these types of projects. A solution could be to require the IPP's to spend a minimum percentage of the quarterly budget, so as to keep SED and ED programmes running, whilst still being able to collect the majority of the budget for larger projects.

It is critical for both the community funds and the IPP's to focus their efforts on creating alternative industries and forms of income for the communities, that can sustain them once the mines are closed down. This is the major reason for mining town failure. Another key factor in creating sustainability is understanding the issues that are affecting that community and how best to resolve those issues. There have been too many 'solutions' thought up in boardrooms across the world, that almost completely disregard the actual best interests of the community, but rather focus on the communities 'perceived' issues.

This would be the primary responsibility of the ‘New Architectural Firm’. This is why the “New Architectural Firm’ has to be so much more than the archetypical architectural firm of today. It’s knowledge and expertise need to be much further reaching than just the discipline of architectural design.

7.4 – Global Interdisciplinary Consultancy Firms

7.4.1 – Global Interdisciplinary Consultancy Firms – Process Driven Development Projects

There is a growing global trend of integrated interdisciplinary consultancies. These, mostly, Consulting Engineering firms include company’s such as Hatch, Bosch Holdings, EON Consulting and Mott MacDonald Consulting. These companies have proven that multidisciplinary infrastructure development is not only efficient but also very successful (Jamieson, 2011, p. 22).

These large multidisciplinary consultancies are operated and managed by mainly professional engineers. Meaning that there is a shift in the industry from designer-led firms to process-driven firms (Jamieson, 2011). Likewise, it means that the architect, who is traditionally the principal agent, is no longer in control of the project. This has a direct effect that the project is no longer design driven, but rather product driven. These major corporations are very attractive to clients whose major concern is risk mitigation. Clients that are mostly using these corporations are international clients who do not know the local industry well, large scale clients and very often the public sector or projects related to the public sector. As a result of this it can be said that the major driving factor for the architectural industry, in the last 15 years, is risk, or the mitigation thereof (Jamieson, 2011).

As highlighted above the ‘New Architectural Firm’ has to have a broader knowledge base and have a better understanding of the needs of the communities it is ultimately serving.

7.4.2– Global Interdisciplinary Consultancy Firms – Shortcomings

Whilst Global Interdisciplinary Consultancies are able to complete development projects more efficiently and cost effectively they are not the perceived the ‘one stop shop’ that their clients believe them to be. Because of their size, corporate and management structure they do not create ultimately successful development projects that can create social change.

By definition they are process driven rather than product or goal driven. Because they are not design-led operations they are too clinical. Despite the fact that these consultancies are swallowing small and medium sized architectural practices to form part of their business, in a bid to not only boost their design capabilities and credentials but also to create the whole package product for their clients, they are not suited to humanitarian architectural and community development projects.

A softer touch is required when dealing with historically disadvantaged communities and humanitarian architectural and development projects, which is not the strong suit of major multinational corporations. Despite the fact that they have architectural departments within their structures, those architects are not leading the projects from a humanitarian architectural point of view. The architectural design is still being run and manged in a process led manner.

Another reason why major multinational companies, like mining houses and infrastructure developers, are choosing to use consultancy firms for development projects is risk mitigation. The promise of a ‘whole package’ deal very enticing because of its efficiency (Jamieson, 2011, p. 22). It also removes a lot of the required effort from the client. A factor in risk mitigation is accountability. With only one company dealing with all the aspects of a project that company is solely responsible for the outcome of the project.

Major corporations also have certain proformas that they work with, one of the most internationally recognised and utilised of these quality management proformas is the ISO 9001 and ISO 9004 standards, which were developed by the International

Organisation for Standards (International Organisation for Standards, 2018). Having a large consultancy that works on the same standards makes it easier for the client to manage the project through their own systems. This is a major risk mitigating factor, an also means that if the consultancy does not follow or meet the ISO standards it is easy to seek recourse. Another risk mitigating factor is that mega consultancies are financially more resilient and stable making it less likely that they will run into financial difficulties, which may affect the outcome of the project. (Jamieson, 2011, p. 34)

Major clients like mining houses are also completely profit driven and tend towards meeting legal requirements rather than actually wanting to effect real change and development that can lead to social change and sustainability for post-mining towns and their communities.

All of this rigidity and process orientated management does not create a comfortable space for humanitarian architectural innovation and exploration. For this to happen the development needs to be designer driven, goal and product orientated rather than process driven. (Jamieson, 2011, p. 34)

7.5 – Multidisciplinary Firm

7.5.1 – Multidisciplinary Firm – 'Development Firm'

It is critical that these development firms are designer-led. However, they need to be multidisciplinary, and not just in terms of incorporating engineers or project managers into their corporate structures. If there is to be truly meaningful interaction between the communities the development project intends to serve it needs to be handled by professionals, such as sociologists, social workers and even economists.

For many years, throughout the 'development era' and since then, architects have been providing services and developing skills which are, firstly not thought by clients to fall under the role of architects and secondly, paid for by clients. "These roles include all the community consultation and analysis, brief development, strategic thinking and preparatory work that lies behind the early design stages" (Jamieson, 2011, p. 32).

Architects currently perform these duties as part of the architectural process and are valued but not understood by clients. The development firm needs to formalise these activities by collaborating with other professionals, such as the aforementioned.

It is becoming increasingly difficult to run a successful and resilient architectural practice; therefore, it is absolutely mandatory that as the needs of clients change that architects and their practices change along with them. Architects have been slow to adapt to the global trend of interdisciplinary consultancies and have therefore lost ground to them. Architects need to continue to upskill themselves and understand how to work in the ever increasingly complex and multifaceted financial environment of the globalised economy, the economy in which their clients exist and thrive.

7.5.2 – 'Development Firm' – In a Post-mining Town and Social Development Context

When it comes to the post-mining towns and social development context, it is important to note that, as an architect, the communities being dealt with form the lower tiers of the community. They are the people that form the lowest echelons of the community's hierarchy and are therefore the most vulnerable. Most often these communities are made up of mine workers, their families and dependants. There is often a ratio of 1 provider to 5 dependants, in these communities (Statistics South Africa, 2015, p. 21). When mines close, these are the people who suffer the most. Special care needs to be taken with people who are most susceptible to the negative effects of mine closure.

Often these people are machine operators, or similar, people with medium skill levels in the mining structure. They, unlike mine management, are most often not reassigned to another mine upon closure but rather retrenched. Because of their families and dependants, they are unable to move to a different mine, even if there was a position for them. This immediately places entire communities in very precarious positions.

This is where a ‘Development Firm’ and IPP funding can have a major effect on the community. Development for sustainability would be the key mandate for a ‘Development Firm’, creating SED and ED projects would directly benefit this forgotten portion of the post-mining community and allow them to develop different skills and businesses in alternative industries that would allow them to support their families and dependants post-mining.

7.6 - Development for Sustainability in Post-Mining Towns in South Africa

SED an ED in mining communities is by no means a new concept. Mining houses have been attempting to do this for many years now. However, it seems as if their efforts have always been somewhat muted. This may be for several reasons. The first being that the very nature of the mining industry means that it is ultimately not sustainable. The recovery of a non-renewable resource can only last as long as that resource is available, or more accurately whilst that resource is available and economically feasible to recover. The feasibility of mining that resource plays a major role in the longevity of a mine and is very susceptible to change as many factors affect the feasibility. Some of these factors include the commodity price of that resource, the cost of recovering and refining that resource and the market for that resource. The cost of recovery and refining includes the cost and source of labour, which in South Africa is very volatile, and the cost of technology and infrastructure required to recover and refine the resource. If any one of these factors causes the profitability of the mine to cease, then the mine will close, either temporarily or permanently. The mining industry is therefore precariously positioned on a knife’s edge, and in a country where mining is one of the biggest industries, in terms of GDP and jobs, that puts a large portion of the population at risk.

As discussed in Chapter 5, mining towns were initially under direct ownership and control of the mining companies that owned the associated mine. These mining companies specially limited the development of alternative industry so as to enjoy monopolies on both the workforce market and running of the town.

Mining companies for a large part focus on the profitability of their mines and meeting the minimum legal requirements for community development, but not really creating sustainability (WWF, 2015, p. 23). The reason for this is mostly due to the fact that once the mine closes they no longer have a reason for the mining town to exist as they will not need its population as a workforce. Whilst this view may be disputed by mining companies the evidence or lack thereof, of mining companies creating sustainability for a post-mining scenario is very clear.

As discussed in Chapter 3, there are many facets to creating sustainability in towns and cities. Some of these facets or issues, such as water and sanitation, can be solved by direct architectural interventions. But the vast majority of these issues require education, good governance and good policy making, these issues are therefore not directly soluble by architectural interventions.

Hertzberger (1999) believed that the role of the architect is not to create perfect and complete solutions, but rather to provide spatial frameworks that can be filled by the intended users to create solutions. This theory was a continuation of LeCourbusier, who states that “architectural has the ability to inform social change” (Leach, 1996, p. 8, cited in Carter, 2007), but not to create it. And again, by Foucault, when he stated that “architectural form cannot in itself resolve social problems” (Leach, 1996, p.10, cited in Carter, 2007, p. 6).

It is vitally important to note that creating sustainability is far more complex than just creating infrastructure. It is a framework that has to be laid that will allow for sustainability to develop. This is why it is so important to have the community involvement in development projects. The effect of not having community involvement is that companies create ‘white elephants’ that are supposed to solve perceived issues rather than the real most poignant issues. Timing is also a massive part of creating sustainability, an issue may be very real in a community, but it might not be the issue that needs to be solved most urgently. This is where the ‘New Architecture/Development Firm’ can really delve into the issues in a certain community. Due to their multidisciplinary composition, they have a far greater ability to understand, and create appropriate solutions to the community’s problems whilst working hand in

hand with that community. It is only through this process that meaningful solutions can be produced which will help to create sustainability in post-mining towns.

7.6.1 - Development for Sustainability in Post-Mining Towns in South Africa – How to create Sustainability

Sustainability in post-mining towns cannot just be created by building architectural solutions. IPP funding must be used in a much more wide-ranging manner to achieve sustainability and resilience for post-mining towns. It is not simply a matter of creating infrastructure and hoping that it will create social change, that theory of the 'Development Era' has been proven not to work. (Khan & Allacker, 2014, p. 16).

One of the major issues in these towns is a lack of 'appropriate' infrastructure, and what infrastructure there is has often been incorrectly designed or scaled and is therefore either being used incorrectly or underutilised. (Advisor, 2017). It is therefore important for the 'New Architectural Firm' to focus on projects/spaces that are multipurpose and adaptable. So as the needs of the community change the spaces can adapt along with them, rather than becoming obsolete and underutilised. Adaptive re-use will need to form a major part of the architectural theory used by the 'New Architectural Firm'.

Education is a major issue in mining towns, not only primary and secondary education, but also skills development, health education and social education. In order to become sustainable and resilient in a post-mining context, alternative industry and therefore employment needs to be created. The only way for this to happen is through education. This has either to be direct transfer of skills into the new industry or training to be able to enter the new industry. Training colleges and educational workshops are the best way to create new skills, however without a new industry for them to support they are as unsustainable as the mines themselves. This is why sustainability needs to be viewed as a much larger project that is multifaceted, instead of individual projects that only focus on certain issues. Designers need to make sure that the different solutions compliment and work hand in hand with one another, feeding each other. Building a

training college that trains people for an industry that doesn't exist is pointless and a waste of funding.

Unfortunately, there is a serious lack of collaboration between IPP's and the design teams who are employed to try and tackle some of the sustainability issues faced by communities. Some communities are fortunate enough to be surrounded by 3 or 4 different IPP's, however, there is no understanding or liaison between them to either join their funding to allow for bigger projects to be completed, or which companies are dealing with which issues. Unfortunately, this means that there is often an overlap in work done by the design teams, in terms of community involvement, and also in terms of solutions becoming counteractive.

This lack of collaboration or at the very least shared information means that the IPP's are more likely to build, new, single purpose buildings that do not relate to other development projects creating further underutilisation and misuse of infrastructure.

Chapter 8 – Conclusions and Recommendations

8.1 Conclusions

This is relevant research, due to the fact that mining in South Africa, which forms a major part of the economy, is in decline, as the cost of mining increases. This means that mine closures are going to become a more common occurrence.

Mine closure has a catastrophic effect on mining towns that were designed to serve the associated mine. The closure of mines means the complete loss of income for many of the inhabitants of the respective town, and their dependants. Because these towns exist to serve the mine, and the workforce required to keep the mines operational is so vast, mine closures will put millions of people at risk in South Africa. This is even more true for the Northern Cape where mining is the provinces major source of revenue. One saving grace is that many of the major mining towns in the Northern Cape are now also playing host to IPP's. The CSI funding from these IPP's can be used to help these towns survive in a post-mining context. Because these mining towns are mono-industrial towns and therefore the closure of the associated mine and lack of any other significant industry means there is nowhere else for the majority of medium skilled labourers to work.

The only way for these towns to continue to exist is if major steps are taken to create sustainability and resilience. Mining company CSI has so far failed to create sustainability and resilience in almost all the towns that would be affected by mine closure. IPP funding can now be used to develop sustainability for mining towns.

However, the methods, funding models and approaches that are being used by the mining companies, for various reasons, including community trust governance issues and a lack of expertise and understanding from consultancy firms, which were discussed in this research report, have failed to create any form of sustainability. This is why new funding models, new ways of thinking about sustainability and new practices have to be developed to create the required sustainability. The development of the 'New Architectural Firm' idea is central to this.

The current architectural firm no longer has the required expertise to effectively design and deal with the very complex process of achieving sustainability. This is due to the multifaceted nature of what needs to be accomplished to create sustainable towns and cities. This coupled with the fact that there is a local and global trend towards awarding these types of community development projects to global consultancy firms, run on a process driven basis, means that these projects are not creating the desired outcome.

This is why the 'New Architectural firm' whilst still designer-led and product orientated, needs to be made up of more than just architects and engineers. It is only the collaborative effect of this new multidisciplinary profession team that will have the knowledge and experience to effectively and successfully engage with the community to create sustainability in post-mining towns.

Due to the nature of this research topic it stands to reason that this report may have implications on an institutional level. If one is to accept the conclusion that has been laid out in the report then it may be necessary for Institutions of Higher Education to revise the way they teach Architects and thereby alter the type of architects that are being produced. The role of the IPP's and the associated SED and ED funding is merely an instrument by which to expand and explore the possibilities of creating sustainability and resilience in post-mining towns in South Africa, through a new typology of architectural firms.

8.2 Recommendations

With the knowledge that has been gained through the completion of the research report it is clear that there need to be further studies conducted on the topic. These new studies should focus on the same methodology but on other sites within South Africa. By doing so it will become determinable whether or not it is possible to create a template for creating sustainability and resilience in post-mining towns or alternatively whether each site needs to be dealt with on a case by case basis.

A further study of the IPP funding model needs to be conducted, with special attention being given to whether different IPP's (Onshore Wind, Solar PV, Biogas, Concentrated

Solar Thermal, Biomass, Small Hydro, etc.) require different funding models to allow for the best results with regards to sustainability and resilience in post-mining towns in South Africa.

Once the above outlined studies have been concluded further action research needs to be conducted. This is essentially the stage at which pilot projects need to be implemented so as to understand the practical efficiencies and problems that arise. This information must then be absorbed into the study so it can be used to create better models through an understanding of the pragmatic applications of such a project.

As is highlighted in this research report the necessity for interdisciplinary cooperation and coordination is of the utmost importance. The same is true of the further research that needs to be conducted. Any further studies that are conducted on the topic need to be performed by an interdisciplinary research team that not only specialises in the built environment but also in the fields of finance and the economy. Further research should be conducted by a multi-disciplinary team, with members coming from both the School of Architecture and the Business School.

Another important element of further research into this topic is the continued appraisal of the existing policies and models that are currently in place for IPP's and their SED and ED funding structures. It is vitally important for lessons to be learnt from the policies that are currently in place. Only from understanding the positives and negatives of these policies will researches be able to expand and adapt the existing policies to more effective and efficient ones.

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Annexure A - Interview A Questions

Interviewee: Former climate change and sustainability advisor, IPP Company, Northern Cape

Questions:

1. Why have some IPP's decided to deal with sustainable development projects in house?

2. How does the IPP decide on which projects to fund, what is entailed in the application and judging process?

3. What were the governance issues that you encountered working with community trusts?

4. How can you, as the funding company, help to try and get the correct people on the board of trustees?

5. Have you, as the funding company, found it easier to work with the community trusts or to work directly with people who are seeking funding for SED and ED?

6. What are the risks that you, as the funding company, take by keeping this process inhouse?

7. What is the company's position on the governments new nuclear agenda?

8. Do you see a clear future for IPP's in South Africa, if the governments nuclear agenda comes to fruition?

9. What role and at what stage do you consult with architectural/design firms?

10. Do you see a role for 'The New Architectural Firm' in the IPP market space?

Annexure B - Interview B Questions

Interviewee: ED Platform

Questions:

1. What are the specific challenges faced by community trusts, when it comes to SED and ED projects.

2. Does ED Platform work directly with community trusts?

3. Does ED Platform directly manage community trusts?

4. How does ED Platform get paid, directly from community trusts, or through IPP company's?

5. Do you see a space for a multidisciplinary Architectural based firm in the IPP funded SED and ED market space?

6. What different types of professional's work for ED Platform?

7. What types of professionals do you think would form a multidisciplinary firm?

8. What are the shortcomings of the current REIPPPP, and how can future procurement process bids be altered to create better sustainability in post-mining towns?

Annexure C – Ethics Clearance Certificate

[redacted]

SCHOOL OF ARCHITECTURE AND PLANNING
HUMAN RESERCH ETHICS COMMITTEE

SCHOOL OF ARCHITECTURE & PLANNING

CLEARANCE CERTIFICATE
PROTOCOL NUMBER: SOAP119/10/2017

PROJECT TITLE:	A critical analysis of how Independent Power Producers (IPP's) can help to secure a sustainable future for post-mining towns in South Africa through new models of architectural practices that are modelled on 'Rural Studios' companies, to promote the renewal of architecture as a means of creating new realities and being drivers for sustainable change.
INVESTIGATOR/S:	Peter Harrison (Student No#365007)
SCHOOL:	Architecture and Planning
DEGREE PROGRAMME:	Master of Architecture-SEEC (MArch SEEC)
DATE CONSIDERED:	02 March 2018
EXPIRY DATE:	02 March 2019
DECISION OF THE COMMITTEE:	Approved

CHAIRPERSON _____
(Professor Daniel Irurah)

DATE: 06 – 03 – 2018

cc: Supervisor/s: Sechaba Maape

DECLARATION OF INVESTIGATORS
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to endure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee.

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Annexure D – Images, Diagrams and Figures

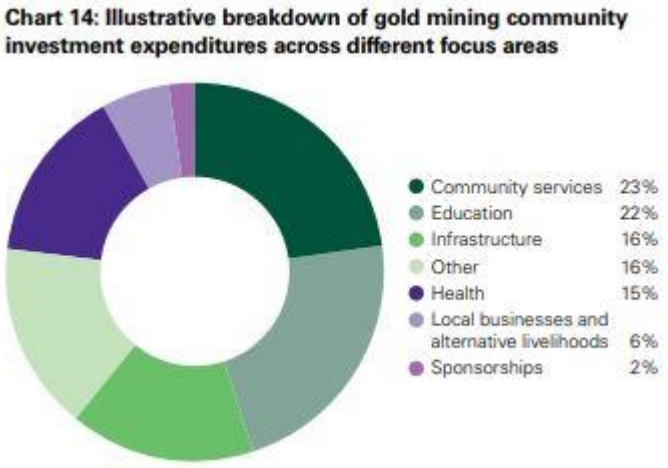

Figure 7 - Graph showing Investment Expenditure across different focus areas in the Global Gold Mining Industry (World Gold Council, 2015)

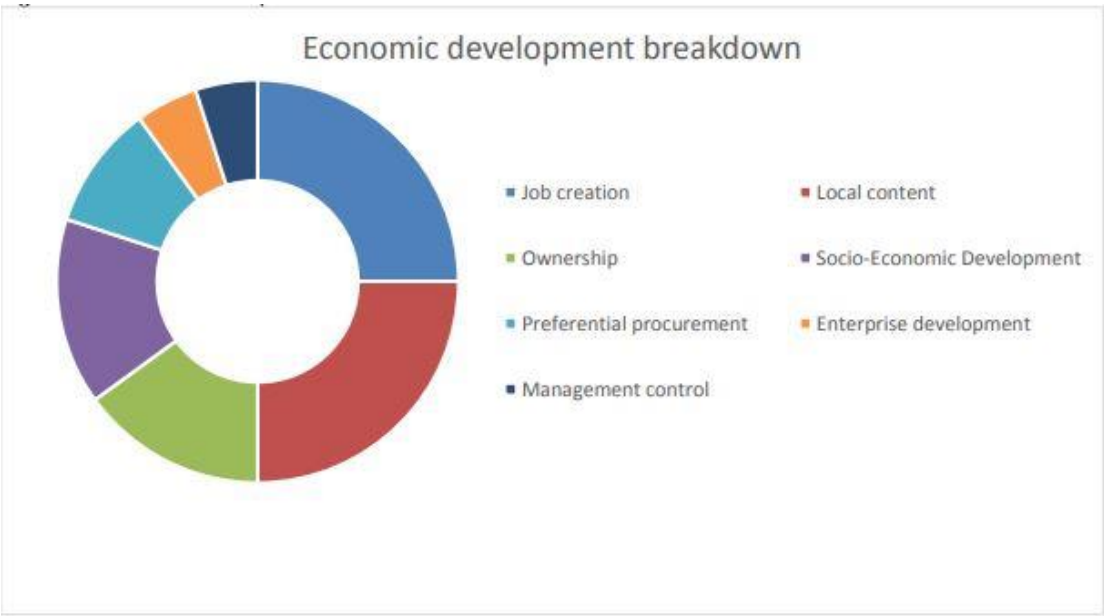

Figure 8 - Graph showing Economic Development Breakdown for the Mining Industry. (WWF-SA and GreenCape , 2015)