

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED H2 ENERGY POWER STATION NEAR KWAMHLANGA, MPUMALANGA

Socio-Economic Scoping Report

Draft

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EXECUTIVE SUMMARY

Urban-Econ Development Economists (Urban-Econ) was appointed by **Savannah Environmental (Pty) Ltd** (Savannah Environmental) to undertake a Socio-Economic Scoping Study for the proposed H2 Energy Power Station and associated infrastructure near KwaMhlanga town in the Mpumalanga Province. The study is conducted as part of the Environmental Impact Assessment (EIA) process managed by Savannah Environmental. This document forms part of the deliverable for the scoping phase of the process and sets out to:

- » Determine the current socio-economic baseline characteristics of the preliminary delineated study area that represents the socio-economic environment that may be affected by the proposed project;
- » Identify and describe the potential influence of the proposed project on the surrounding economic activities and communities;
- » Highlight any red flag areas and concerns that may be associated with the project; and
- » Describe the approach to assess the identified impacts during the phase.

Policy Review

The following key policies and strategic documents were reviewed:

National strategic documents:

- » National Growth Path Framework (NGPF) (2010)
- » National Development Plan (NDP) 2030 (2011)
- » Industrial Policy Action Plan 2014/15-2016/17 (2015)

Provincial strategic documents:

- » Mpumalanga Growth and Development Path (2011)

Local strategic documents:

- » Nkangala District Municipality Environmental Management Plan (EMP) (2015)
- » Nkangala District Municipality Integrated Development Programme (IDP) (2015)
- » Nkangala District Municipality Spatial Development Framework (SDF) (2014)
- » Thembisile Hani Local Municipality Integrated Development Plan (IDP) (2016)
- » Thembisile Hani Local Municipality Spatial Development Framework (SDF) (2014)

Baseline Profile

In summary, these are the general characteristics of the study area:

- » The population of the Thembisile Hani Local Municipality (THLM) was 310 455 in 2011, living in 75 635 households.
- » The majority of the municipality's population is Black and the commonly spoken language is isiNdebele.
- » The female population is more dominant in the THLM.
- » The municipality has a youthful population, and is also characterised by a high dependency ratio.
- » Education levels within the THLM are low, with 17.7% of the population having no form of education.
- » The municipality's average monthly household income equates to R5 004, which is in stark contrast to KwaMhlanga town's income of R27 695. This suggests that

households in KwaMhlanga town enjoy higher standards of living as compared to the rest of the municipality.

- » The THLM contributes approximately 8% and 3% to the district municipality's and provincial Gross Domestic Product per region (GDP-R), respectively.
- » The tertiary sector is the largest contributor to the LM's GDP-R.
- » There is high unemployment within the THLM (36.4%), which demonstrates a need for job creation.
- » Access to basic services in the local municipality is generally high, with the exception of sanitation in which case the majority (85,2%) of households are still using pit latrines either with or without ventilation.

Identification of Socio-Economic Impacts

Overall, the following potential issues and impacts will need to be considered during the EIA phase:

- » During the construction phase:
 - Impact on balance of payment due to possibility that certain equipment and machinery will be imported.
 - Temporary increase in production and Gross Domestic Product per Region (GDP-R) of the national and local economies due to project capital expenditure.
 - Temporary creation of employment in the local communities and elsewhere in the country.
 - Skills development due to creation of new employment opportunities.
 - Improved standards of living of households directly or indirectly benefitting from created employment opportunities.
 - Temporary increase in government revenue due to the establishment of the power station created employment.
 - Change in demographics of the areas due to an influx of workers and job seekers.
 - Increase in social pathologies associated with the influx of migrant labourers and job-seekers to the area.
 - Added pressure on basic services and social and economic infrastructure.
- * During the operational phase:
 - Sustainable increase in production and GDP-R of the national and local economies through operation and maintenance activities.
 - Creation of long term employment in the local and national economies through operation and maintenance activities.
 - Skills development due to the creation of new sustainable employment opportunities.
 - Improved standard of living of households directly or indirectly benefitting from created employment opportunities.
 - Increase in government revenue stream.
 - Investment in the local community and economic development projects.
 - Potential losses of sustainable revenue by local farming and/or tourism activities, if any, due to various environmental impacts.
 - Altered sense of place.

- Impact on the local tourism industry.
- Electricity generated and fed into the national electricity grid

Conclusion

The proposed project will likely have some positive benefits as well as negative on the receiving environment. Any other potential socio-economic impacts raised by Interested and Affected Parties (I&APs) during the public participation process throughout the EIA process, as well as impacts that might be identified through other specialists' studies will also need to be examined during the EIA phase. To ensure that the assessment is comprehensive, a zone of influence or the extent of the directly and indirectly affected environment will be delineated in consultation with other specialists. This zone will be used to determine the extent of primary data collection, which will include interviews with the lessee currently lodging on the land, occupiers and/or workers within the zone of influence of the project and other I&APs.

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ABBREVIATIONS

CAGR	Compounded Average Growth Rate
DM	District Municipality
DoE	Department of Energy
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
GDP-R	Gross Domestic Product per Region
I&P	Interested and Affected Parties
IDP	Integrated Development Plan
IPAP	Industrial Policy Action Plan
IRP	Integrated Resource Plan
LM	Local Municipality
NDP	National Development Plan
NGPF	New Growth Path Framework
SDF	Spatial Development Framework

1. INTRODUCTION

This document is prepared by **Urban-Econ Development Economists** (Urban-Econ) in request by **Savannah Environmental (Pty) Ltd** (Savannah Environmental) on behalf of H2 Clean Energy (Pty) Ltd to undertake a Socio-Economic Scoping Study for the **H2 Energy Power Station** near KwaMhlanga, in the Mpumalanga Province. The socio-economic impact study is conducted as part of the Environment Impact Assessment (EIA) process managed by Savannah Environmental. This document forms part of the deliverable for the scoping phase of the process and undertakes to determine the current socio-economic baseline characteristics of the preliminary delineated study area, and identify potential influence of the proposed project on surrounding economic activities and communities to guide the assessment during the EIA phase.

1.1 Scope of the study

The purpose of the socio-economic impact assessment is to determine the potential socio-economic implications of the project activities and associated infrastructure, and to compare its effects with the “no-go” alternative. The “no-go” alternative assumes that the proposed H2 Energy Power Station is not established, which means that it represents the current status of the environment, including the socio-economic situation.

The current report is prepared as part of the socio-economic study and is used as an input into the scoping report compiled by Savannah Environmental. The scoping phase inputs address only a portion of the scope of work involved in the Socio-Economic Impact Assessment Study, and enable the project team and applicant to make more informed decisions regarding the way forward for the proposed project, from an environmental management point of view. The purpose of the socio-economic scoping report is as follows:

- » Undertake a policy review and assess the alignment of the proposed project with the national, provincial and local socio-economic policies.
- » Create a socio-economic profile for the study area using secondary data.
- » Identify potential negative and positive economic impacts that could be generated by the proposed alternatives during the project life cycle.
- » Identify impacts and project effects (direct, indirect, induced, and cumulative) that will require further investigation and recommend an approach for perusal during the EIA phase for completion of the impact assessment exercise.
- » Identify gaps in knowledge and data that will need to be addressed during the EIA phase.

1.2 Project background and description

Traditionally, coal has dominated the South African energy supply sector from as early as the year 1880. Today, approximately 77% of the country’s primary energy needs are provided by coal. Although coal is a non-renewable resource, the cost effectiveness of coal mining as well as electricity generation makes it highly unlikely that another energy source will be adopted for baseload power generation in the near future. Linked to this, according to the 2014/2015 South African Yearbook, the energy supply situation in South Africa is

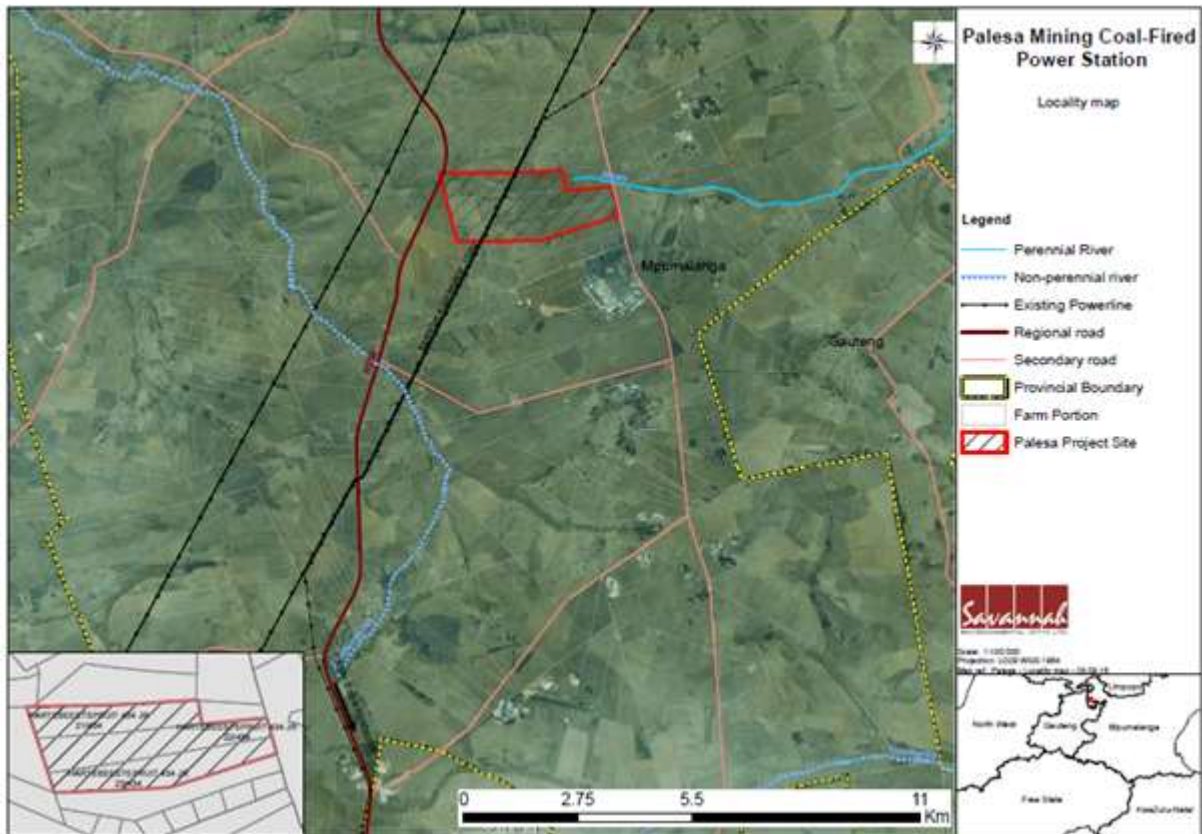
expected to remain the same for the next two decades. This is exacerbated by the fact that South Africa's coal deposits are relatively shallow with thick seams resulting in the exploitation of the fuel to be favourable. This has resulted in almost 90% of the country's energy being driven by coal-fired stations as well and has led to the development of a lucrative coal mining industry in South Africa.

The proposed project involves the development of the 600 MW H2 Energy Power Station and associated infrastructure near KwaMhlanga, in the Mpumalanga Province. Coal required for the project will be sourced from the existing Palesa Coal Mine, located approximately 1 km south of the project site. Electricity generated by the project will feed into and supplement the national electricity grid. Power line route alternatives will be determined based on the final project layout and grid connection point. These will be assessed through a separate application for Authorisation.

The main infrastructure proposed includes:

- » An overland coal conveyor.
- » Raw materials loading and offloading, storage areas, and handling facilities.
- » A coal crusher (and screening plant in the case of PC technology).
- » Power generation units.
- » Ash dump.
- » Water infrastructure including a raw water storage dam, Wastewater Treatment Plant (WWTP) and storm-water runoff dams.
- » A substation/switching yard.
- » Office and maintenance area(s) and buildings.
- » Access roads.

The proposed power station is to be located on Portion 21, 22 and 23 of the Farm Hartebeestspruit No. 434 situated approximately 9 km south of KwaMhlanga, and approximately 1 km north of the Palesa Coal Mine in the Thembisile Hani Local Municipality of the Nkangala District in Mpumalanga Province (refer to Map 1-1).



Map 1-1: Project site (Savannah Environmental, 2016)

KwaMhlanga, which is located approximately 9km north from the project site, is the closest town to the site. KwaMhlanga lies within the Thembisile Hani Local Municipality (LM) in the Nkangala District Municipality (DM) in the Mpumalanga Province. The Thembisile Hani LM is a relatively large municipality with 310 455 people, and is also one of six local municipalities. Surrounding municipalities include the Victor Kanye LM, with a population of 75 452 people; the Emakhazeni LM, which has 47 215 people; the Steve Tshwete LM, which has a population of 229 835 people; the Dr. JS Moroka LM, with 249 704 people; whilst the Emalahleni LM has a total population of 395 464 individuals. Within the Mpumalanga Province, the Thembisile Hani LM covers a total surface area of 2 384km² and it is bordered by the Dr. JS Moroka LM on the north, the Steve Tshwete LM on the east, and the Emalahleni LM towards the south.

In order to delineate the study area, it is important to understand the concept of socio-economic impacts. The socio-economic impacts on the project area and surrounds are dependent on the activity and the structure and composition of the locality. The more diversified the immediate locality of the project is in terms of its socio-economic variables, the more concentrated the impact will be in that area. Understanding the potential distribution and concentration of impacts is important to determine the magnitude and significance of these impacts in the context of spatial units.

The Thembisile Hani LM is a predominantly rural municipality in its nature, and the main economic sectors are public services, retail, business and agriculture. Throughout the municipality, there exists a total of 76 different towns and villages (Thembisile Hani Local

Municipality, 2014). The largest concentration of people within this municipality is found in the northern area which is mainly Kwaggafontein and north-western region of the LM which consists of Moloto as well as KwaMhlanga .

It is likely that some labour, goods, and services required during the construction phase will be sourced within the Thembisile Hani LM, while the majority will be sourced from the rest of the Mpumalanga Province, other parts of the country and possibly other countries. During operations, most of the labour will come from within the LM, although it might mean many of the workers will first need to relocate to the area with their families. This may especially be relevant regarding the procurement of highly skilled and specialised labour. As far as inputs are concerned, coal; which is the main expenditure item will come from the local mining sector, whilst other goods and services needed during operations will be sourced from the municipality and other parts of the country.

Given the above, the study area is delineated as follows:

- » **Immediate zone of influence**, which includes the farms that form part of entire project site and the adjacent farms, where certain environmental impacts can extend to.
- » **Primary study area** includes the site, KwaMhlanga town as well as the Thembisile Hani Local Municipality.
- » **Secondary study area** includes the Nkangala DM and the Mpumalanga Province.
- » **Tertiary study area** encompasses the whole of South Africa. The direct effects of the construction and operation of the power station will be distributed throughout the country and will not be concentrated in a specific municipality. At the same time, certain inputs will be sourced from outside South Africa and would have a macro-level effect, again highlighting the need to look at the country's profile.

1.3 Methodology for the scoping phase

The methodological approach adopted for conducting the scoping study includes three phases:

- » **Secondary data collection:** Secondary research encompasses the examination of relevant policies, local and provincial strategic documents, secondary data presented by Stats SA and Quantec, as well as previously completed studies for projects in the same area. The information obtained assists in profiling the socio-economic environment that could potentially be affected or could benefit from the proposed project.
- » **Baseline profiling:** A description of the study area is given in terms of selected socio-economic variables. It includes the analysis of parameters such as population size and household numbers, structure and growth of the economy, labour force and employment situation. Profiling for the study is done making use of the Quantec Research database, Stats SA's Census 2011 data, and various strategic documents produced for the relevant municipality.

- » **Identification of the anticipated impacts and issues:** This step includes the identification of the socio-economic impacts that could be expected during various phases of the project's life cycle and the way forward with respect to the collection of data required to quantify and qualify the impacts.

2. POLICY REVIEW

Over the years, South Africa has enjoyed relatively strong economic growth; however, despite the improved growth, the South African economy is one of the most unequal societies in the world. This means that although the development path of South Africa has improved, it has remained the same for most individuals (Department of Economic Development, 2010). Thus, in order to rectify this shortcoming, there is a general consensus within the **New Growth Path Framework (NGPF)** (Department of Economic Development, 2010) and the **National Development Plan (NDP)** (National Planning Commission, 2011) which confers that the country's economic approach needs to shift from State dependency to encouraging people to be active champions of their own development (National Planning Commission, 2011). At the heart of this strategy is the need to tackle the triple threat challenges crippling the country, namely poverty; unemployment and soaring inequality levels. As a result of that, the NGPF as well as the NDP have set job creation targets which are believed to be the main solution for reducing inequality. Whilst the **NGPF** has set a target of 5 million new jobs by the year 2020, it has also highlighted infrastructure development as the main driver for decent work opportunities. This is envisioned to be achieved through targeting labour-absorbing activities across the main economic sectors such as agriculture, mining value chains, and manufacturing services (Department of Economic Development, 2010). The **NDP** identifies similar key challenges as it highlights that "too few people work" and that "South Africa remains a divided society" further stressing the inequality challenge. The NDP, therefore, encourages all regions to seize the advantage of the natural resources endowed to them towards achieving accelerated economic growth, poverty alleviation and job creation. This; however, needs to be done in a sustainable and equitable manner (National Planning Commission, 2011). Linked to this, the NDP in particular also recognises the economy as "energy intensive", and given the effect of the 2008 energy crisis observed in the country, the importance of adequate and uninterrupted supply of electricity is evident (National Planning Commission, 2011).

The **Department of Energy (DoE)** has established the Coal Baseload Independent Power Producer Programme (IPPP). The programme was established in late 2014 as the first baseload programme, with the intent to allow the private sector to participate in electricity generation through the use of coal resources (Department of Energy, 2015). The programme has also been specifically designed to procure energy capacity derived from 2 500 MW of coal-fired power generation with individual bids capped at 600 MW per project. In this process, a contribution is also made toward energy security as well as sustainable growth objectives. The preferred and already approved bidders of the first bid window for the coal-based programme are the Thabametsi and Khanyisa Power Stations, which will collectively add 863,3 MW to the country's grid in the next five years. These two coal projects will add to the much needed capacity of South Africa's national grid and the needed investment in infrastructure which will stimulate local procurement as well as result in employment opportunities in the construction and operation sectors (Department of Energy, 2015).

The **Industrial Policy Action Plan (IPAP) 2014/2015 – 2016/2017** represents the sixth annual iteration of the first IPAP launched in the 2007/8 financial year. It represents a significant step forward in scaling up the country's efforts to promote long-term industrialisation and industrial diversification beyond the current reliance on traditional commodities and non-tradable services and to promote sustainable development. The IPAP identifies mineral beneficiation as one of the key sectors, in which to strengthen industrial policy interventions. Given that coal is currently the most abundant and affordable of all fossil fuels within the country, it is perceived that it will continue to play a vital role in meeting energy demand worldwide and in South Africa. However, the IPAP also identifies promotion of the green industries to further the country's development of the green economy and transition to a low carbon economy (Department of Trade and Industry, 2015).

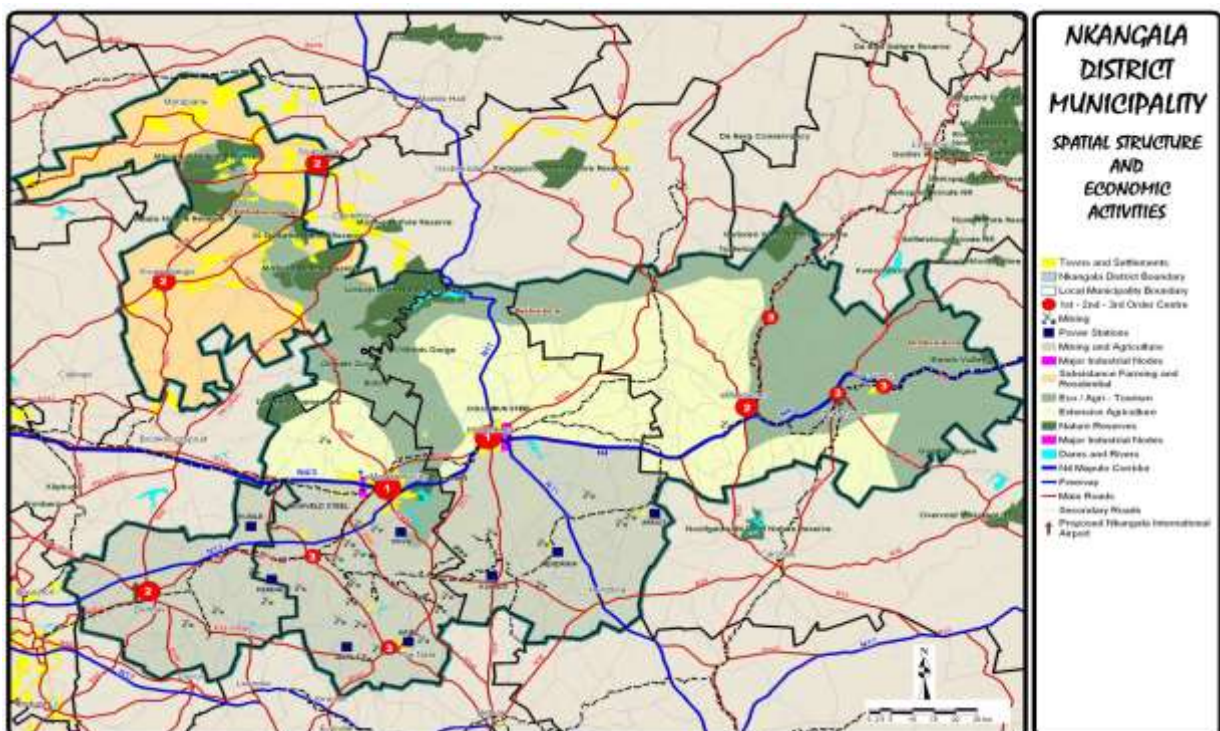
According to the **Mpumalanga Growth and Development Path**, large coal deposits are situated in the Mpumalanga Province, meaning that the generation of electricity through coal-fired power stations mainly takes place in the Province. The Province also houses eleven out of the thirteen currently existing coal-fired power stations; providing a total contribution of 76% is made toward South Africa's energy supply. Coal is an expanding and cheap energy source that results in a series of environmental considerations that force coal mining and its' utilisation to use cleaner technologies (Mpumalanga Government, 2011).

The **Nkangala District Municipality Environmental Management Plan (EMP)** highlights the critical commitment of the district municipality in ensuring and creating a sustainable environment for future generations through adopting programmes and plans that are in compliance with environmental legislations of South Africa. Furthermore, although the municipality recognises its role for basic service provision such as electricity, it also highlights that alternative household energy sources such as coal, wood and paraffin contributes to air pollution in the DM. The wide variety of pollution sources from industry and power generation activities has resulted in widespread air pollution problems in the south-western part of the DM, mainly in the Emalahleni LM. The water quality in the area has also deteriorated because of the surrounding coal mines (Nkangala District Municipality, 2015). According to the **Nkangala District Municipality Integrated Development Programme (IDP)**, mining activities are mostly concentrated in the southern regions of the district and they are often associated with coal-fired power stations. As a result of this the IDP stresses the mining potential of the district and further places emphasis on the need for the Thembisile Hani LM to be enhanced so as to contribute to job creation for poor and unskilled workers (Mpumalanga Government, 2015). The **Thembisile Hani Local Municipality Integrated Development Plan (IDP)** reiterates this same statement by placing emphasis on the need for the LM to focus on maximising its' contribution to job creation by ensuring that most job creation initiatives within the LM use labour intensive methods wherever possible (Thembisile LM IDP, 2016).

One of the key drivers of the spatial rationale at the Provincial and local level is Mining and energy-related development. This particular driver is premised on the promotion of economic development and job creation in relation to the space economy of the

Mpumalanga Province (Mpumalanga Government, 2014). In addition to the mining activities dominating the resource-based economy, the **Nkangala District Municipality Spatial Development Framework (SDF)** identified agriculture as an important sector to the economy of the DM. The southern part of the LM is predominantly dominated by subsistence farming as intensive crop farming takes place and is it mainly suitable for fresh produce such as maize and vegetables whilst the northern parts of the region are mainly suitable for cattle and game farming. The Nkangala DM also offers great tourism potential. The main tourist attraction factors to the area are the natural beauty, rural environment as well as the popularity of fly-fishing (Mpumalanga Government, 2014). According to the **Thembisile Hani Local Municipality Spatial Development Framework (SDF)**, the Mpumalanga Province aims to develop its' tourism sector as a driver of economic activity and diversification as the province has tourism potential. Apart from these plans, the rural parts of the Thembisile Hani LM are predominantly used for agriculture. These two sectors; namely, agriculture and tourism have the potential to employ large numbers of unskilled workers (Mpumalanga Government, 2014).

Although economic development through projects such as the one under analysis have the potential to stimulate economic growth through employment opportunities, thereby improving the standard of living of communities, it is important that such developments be mindful of currently existing sectors such as tourism and agriculture in the area which might be potentially affected. The Nkangala DM EMP has therefore, developed a spatial framework (refer to Map 1-2 below) to guide the spatial development of the district. As illustrated in the map below, it is clear that potentially sensitive parts of the DM such as nature reserves, eco-tourism, subsistence farming as well as extensive agricultural land have been developed far from the currently existing power stations as most of them have been operating for more than 30 years.



Map 2-1: Spatial distribution of coal-fired power stations within the Nkangala DM (Nkangala District Municipality, 2015)

Given the reviewed documentation, it is evident that the proposed project is in line with the national and local government priorities and spatial frameworks. Importantly, no fatal flaws from a socio-economic policy perspective exist, but the conflict between industrial development and the existing eco-tourism present in the area will need to be investigated in detail in the EIA phase.

3. BASELINE PROFILE

This chapter examines key socio-economic characteristics of the study area, as per the delineation provided earlier in the report. This is essential as it provides both qualitative and quantitative data relevant to the communities and economies under observation, creating a baseline that will then assist in identifying the sensitive receptors and potential impacts.

The following socio-economic indicators are analysed in this chapter:

- » Spatial Compositions and Land-Use
- » Demographic Profiling
- » The Economy and its Structure
- » The Labour Force and Employment Structure
- » Status of Infrastructure

3.1 Study area's composition

a) Spatial context and regional linkages

The proposed H2 Energy Power Station is to be located in the Thembisile Hani Local Municipality, which is one of the municipalities making up the Nkangala District Municipality in the Mpumalanga Province.

The **Mpumalanga Province** is located on the east of South Africa and has a total population of 4 039 942 people, equating to 7.8% of South Africa's total population. Geographically, Mpumalanga is the second smallest Province after Gauteng and has a total surface area of 76 495km² with a population density of 52,82 people/km². The Province falls within the grassland biome and is bordered by Mozambique and Swaziland to the east. Mpumalanga is rich with coal reserves and is home to South Africa's major coal-fired power stations; thus, dominant economic activities in the Province are mining, manufacturing, and services. Tourism and agriculture are potential growth sectors.

The **Nkangala DM** is one of the three district municipalities in the Mpumalanga Province. The DM has a population of 1 308 125 people, equating to 32% of the total Province population. During the 2001-2011 period, the Nkangala DM experienced a population percentage increase of 22% (Stats SA, 2011). This is most likely due to the fact that the DM is the economic hub of the Mpumalanga Province and is richly endowed with minerals and natural resources. These two factors as well as its close proximity to the Gauteng Province open up prospects for a larger market and results in people migrating to the DM in search of employment opportunities (Nkangala District Municipality, 2015). The

Nkangala DM has a total surface area of 16 758km² and a population density of 78,06 people/km² (Stats SA, 2011). The DM is situated between the Ekurhuleni and Tshwane Metropolitan Municipalities to the west, the Ehlanzeni District Municipality to the north-east, and the Gert Sibande District Municipality to the south. The Nkangala DM is predominantly rural in its nature and comprises of extensive farming, forestry, nature reserves and mining. There are approximately 165 towns and villages spread across the district and these are mainly classified in three categories namely, towns, villages (residential) and settlements (associated with mining or electricity generation activities) (Nkangala District Municipality, 2015). The prevalent scattered rural nature of the region has resulted in the district having a dispersed spatial structure. The northern region of the DM offers tourism opportunities that are associated with scenic qualities, conservation areas and wetlands (Mpumalanga Government, 2015).

The **Thembisile Hani LM** is located in the western region of the Nkangala DM and has a total surface area of 2 384km². The LM is defined by a largely rural component, high unemployment rates and is isolated with a narrow economic base (Mpumalanga Government, 2015). The five primary settlement clusters in the area include Moloto, KwaMhlanga, Kwaggafontein, Tweefontein and Verena. The northern side of the LM is dominated by commercial businesses and residential activity whilst the eastern part is largely constituted by conservation areas and nature reserves. The southern region comprises limited mining activity whilst the rest of the municipal area is mostly used for agricultural activity such as subsistence farming. (Mpumalanga Government, 2014).

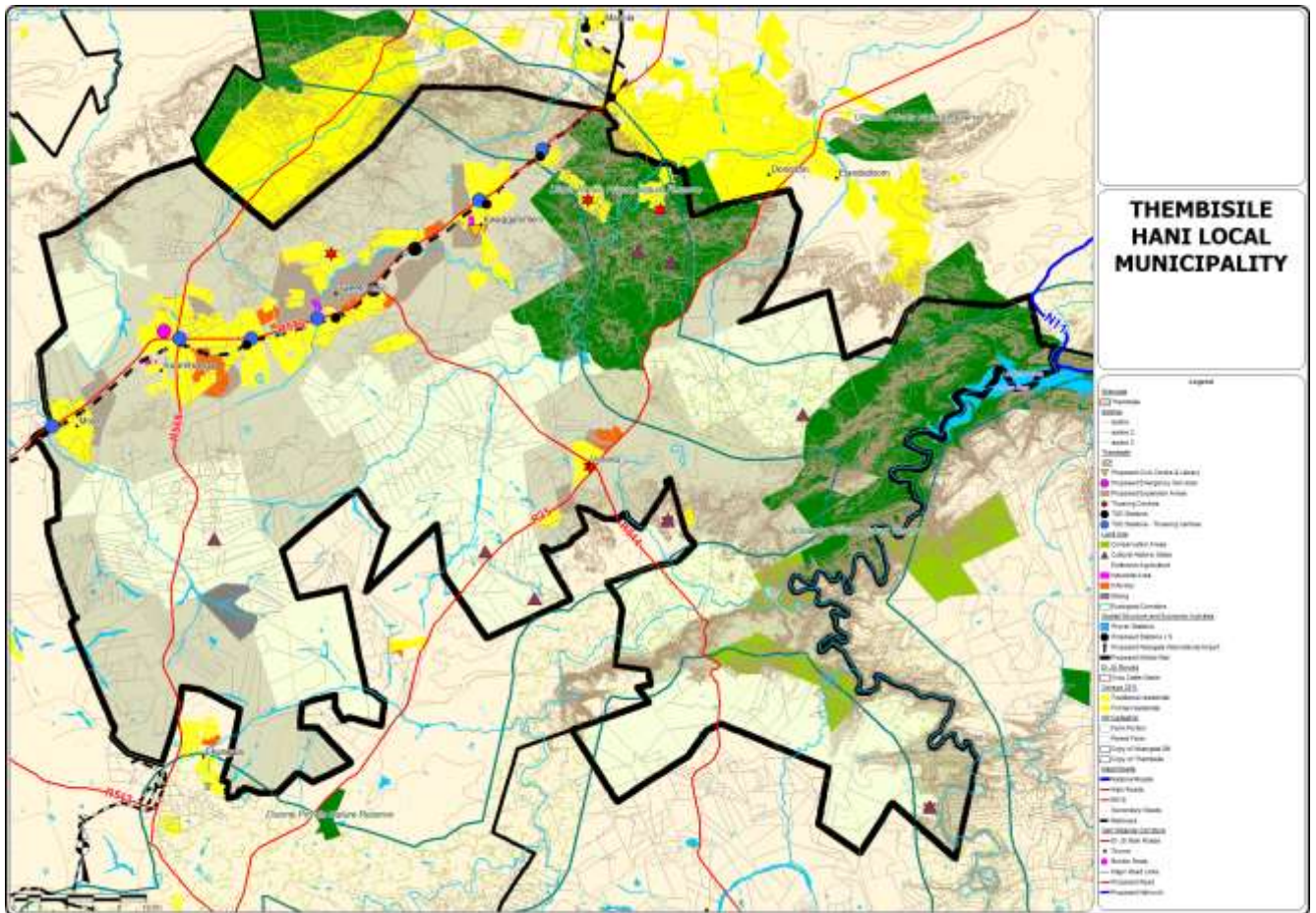
b) Major towns and settlements

The closest major town to the proposed site is KwaMhlanga, which lies approximately 9km north of the site. KwaMhlanga town is the nodal point of the Thembisile Hani LM. The spatial formation of the town is mainly business centred area that branches out into main roads surrounded by a large residential activity (Mpumalanga Government, 2014). The north of the town is mainly retail businesses and the south of the town is immersed in a mixture of retail as well as services land use activities.

c) Resources and land capability

The area where the proposed H2 Energy Power Station is to be developed is primarily demarcated for agricultural-related activities such as small-scale farming. However, as shown on

Map 3-1: Thembisile LM Spatial land use **framework**, most of the land near the proposed project's site is earmarked as expansion areas, which is inclusive of economic activity such as the proposed power station. It can therefore be concluded that the proposed project poses no land use conflict.



Map 3-1: Thembisile LM Spatial land use framework (Mpumalanga Government, 2014)

3.2 Demographic profile

The population of any geographical area is the cornerstone of the development process, as it affects the economic growth through the provision of labour and entrepreneurial skills, and determines the demand for the production output. Examining population dynamics is essential in gaining an accurate perspective of those who are likely to be affected by any prospective development or project. This sub-section describes the status quo of the study area's population at its current state.

a) *Population size*

The Thembisile Hani Local Municipality (THLM) is home to 310 455 people and has a population density of 130 people/km² living in a total of 75 635 households (Stats SA, 2011). Between 2001 and 2011, the population percentage increase experienced by the LM equated to 17%. Of the five primary settlement clusters, approximately 22% (67 902 people) of the population resides in TwEEfontein, 15% (45 098) reside in Kwaggafontein whilst only 2% (7 122 people) live in KwaMhlanga town (Stats SA, 2011). In terms of residential setting, 28,5% of the population of the Thembisile Hani LM resides in urban areas, whilst the rest either reside in tribal areas (69,9%) or live on farms (1,6%) (Stats SA, 2011).

Race, gender and language spoken

The majority (99.1%) of the population in the THLM and KwaMhlanga town are Black; 0,2% of the municipal population is White, whilst 0,3% of KwaMhlanga town is White. The most commonly spoken language in the LM is isiNdebele (58,4%). In the LM, the female population (52.5%) exceeds the male population (47.5%), similar trends can be observed in KwaMhlanga town. A likely contributing factor to the observed gender composition in the LM and KwaMhlanga town is the migration of the male individuals to the Gauteng Province to seek better employment opportunities (Thembisile Hani Local Municipality, 2016). Only 19,5% of the total population of the LM is married whilst 72,03% have never been married.

Age profile

The youth (aged between 15 and 34 years) make up the majority of the people living in the Thembisile Hani LM (36.6%), followed by the group between the ages of 35 and 64 years with 26.4%. Considering the working age group that is between the ages of 15 and 64 years, the municipality has a slightly bigger percentage of working age females than males, which is again attributed to the departure of male workers to other areas in order to seek work opportunities.

The population of the LM is characterised by a high dependency ratio (59%), with 32.1% of the population within the ages of 0 to 14 and over 65 years old (4.9%). The implications of this population structure are a higher demand for the provision of social and physical facilities, like schools, primary health care centres, etc.

Education

In terms of education levels in the LM, 17.7% of the adult population (over 20 years of age) had received no formal education, while 30% have primary or secondary education (Stats SA, 2011). However, only 5,3% of the LM population indicated that they had furthered their studies in the form of higher education. In KwaMhlanga town, a much lower percentage (2.3%) of individuals older than 20 had no formal schooling. Almost 30% of the adult population of KwaMhlanga town completed Matric; and, 45% indicated that they have a higher education qualification. The likely contributing factor to this is that most of KwaMhlanga town is populated by people from outside towns and have found employment in the town, thus, increasing the number of people with higher education qualifications.

Income levels

The average household income in the Thembisile Hani LM equates to a figure of R5 004 in current 2016 prices; while a total of 12% of the households do not receive any form of income. Overall, 62.6% of the households within the local municipality earn up to R3 200 per month. KwaMhlanga town however, manifests a different pattern, only 5% of the households within the town indicated that they had no form of income and only 14.0% earn between R1 and R3 200 per month. The town has an average household income of R27 695 per month. This clearly illustrates the increase in welfare of the local households, which could be attributed to the creation of employment opportunities in specific sectors stimulated by the development in the area. Another contributing factor to the high average household income in the town is the high tertiary education levels in comparison to the

district and local municipality. Lastly, the high income levels within KwaMhlanga town may also be attributed to the fact that the KwaMhlanga nodal point is the highest order node within the entire LM. One may also presume that the higher concentration of individuals employed in the town have stable and sustainable jobs within the formal sector.

Table 3-1: Household income

Area	No income	<R3 200 per month	Weighted average monthly HH income (2016 prices)
Nkangala DM	8%	44,6%	R 9,536
Thembisile LM	12%	62,6%	R 5,004
KwaMhlanga	5%	14,5%	R 27,695

Source: Urban-Econ calculation based on Quantec data, 2016

3.3 The economy and its structure

The structure of the economy and the composition of its employment provide valuable insight into the dependency of an area on specific sectors and its sensitivity to fluctuations of global and regional markets. Knowledge of the structure and the size of each sector are also important for the economic impact results' interpretation, as it allows the assessment of the extent to which the proposed activity would change the economy, its structure and trends of specific sectors.

The Thembisile Hani LM economy is valued at R8 695 million in current prices. This equates to 7,8% of the Nkangala DM's Gross Domestic Product per Region (GDP-R), which is valued at R111 942 million in current prices (Quantec, 2016). The contribution of the LM to the Province is relatively low as it is only 3.3%. Over a period of ten years (2005-2015), the municipality's economy grew at a positive Compounded Average Growth Rate (CAGR) of 2,5% per year. This was lower than the district and provincial average growth rates of 1,8% and 2%, respectively (Urban-Econ calculation based on Quantec data, 2016).

The Thembisile Hani LM economy is largely constituted of the tertiary sector, which contributes over 75% to the GDP-R of the LM. Within the tertiary sector, the growth of the Thembisile Hani LM economy is particularly stimulated by the wholesale, retail and trade sub-sector (22%) as well as general government (20%). The secondary sector is the second largest contributor to the LM's GDP-R as it contributes 20% to the economy, the primary sector plays a small role in the overall LM economy with only a share of 2% (Quantec, 2016).

Although the Thembisile Hani LM is largely a service economy, during the 2005-2015 period; the total contribution of the tertiary decreased from a growth percentage of 11% to 7%. Within the same period, the primary sector sub-sectors; agriculture and mining industries, experienced a decline. The agriculture industry dropped from 20% to -2% whilst the mining sector experienced a more significant decline as it fluctuated from a positive contribution to the GDP-R of 35% in 2005 to -1% in 2015.

3.4 Labour force and employment structure

Employment is the primary means by which individuals who are of working age may earn an income that will enable them to provide for their basic needs and improve their standard of living. As such, employment and unemployment rates are important indicators of socio-economic well-being. The following paragraphs examine the study area's labour market from a number of perspectives, including the employment rate and sectoral employment patterns.

The composition of the labour force in the primary study area is detailed in Table 3-2 below.

Table 3-2: Labour force statistics

Indicators	Mpumalanga	Nkangala DM	THLM	KwaMhlanga
Working-age population	2,591,273	870,412	195,495	5,072
Labour force	1,426,549	509,857	98,148	3,135
Employed	979,391	358,440	62,435	2,670
Unemployed	447,158	151,417	35,713	465
Unemployment rate	31,3%	29,7%	36,4%	14,8%
Labour participation rate	55,1%	58,6%	50,2%	61,8%

Source: (Stats SA, 2011)

During the year 2011, the total working-age population of the Thembisile Hani LM equated to 195 495 people, of this figure; the labour force comprised of 98 148 people whilst 13 350 people represented those that were discouraged job seekers and 83 997 people were economically inactive (Stats SA, 2011). The difference between the number of people that are employed and those that are unemployed in the LM, results in an unemployment rate of 36,4% which is higher than the national and provincial unemployment rates (29,7% and 31,3%). Although the unemployment rate of the LM is relatively high, the labour force participation rate of the LM is 50,2%. In comparison, KwaMhlanga town had a total working population of 5 072 people, which was made up of 2 670 employed people, 465 unemployed people, 79 discouraged job-seekers, and 1 858 not economically active individuals. The town has an unemployment rate of 14,8% which is the lowest in comparison to other areas listed in **Table 3-2** above. KwaMhlanga town also has the highest labour participation rate coinciding with the education levels as well as the average household income trend.

As illustrated in **Figure 3-1**, close to 55% of employed individuals within the THLM are employed within the formal sector whilst only 22.5% are employed in the informal sector. Twenty percent (20%) of employed individuals are employed within the private household industry. Almost 90% of the KwaMhlanga town population works in the formal sector, the rest of the population is either employed in the informal sector (10,9%) or they are working within private households (1,6%) (Stats SA, 2011). Though at different scales, the trends observed within the LM as well as KwaMhlanga town are similar to those that are seen in the Province and the District Municipality.

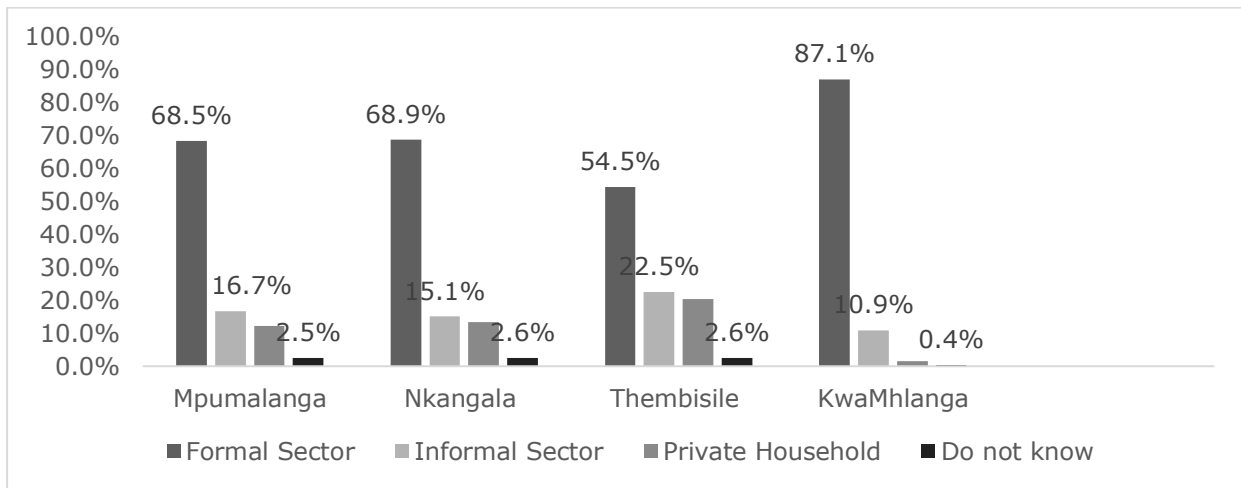


Figure 3-1: Regional employment by sector (Stats SA, 2011)

In terms of the structure of employment, the tertiary sector contributes a share of 61% employment to the total working population of the Thembisile Hani LM. Within the tertiary sector, the leading sub-sectors with regard to employment provision are wholesale and trade (21%) as well as community, social and personal services (17%). The secondary sector contributes a share of 22% of employment, whilst the primary sector provides the least employment opportunities for Thembisile Hani residents. Similar patterns can be observed in KwaMhlanga town, 75% of the residents are employed in the tertiary sector, 23% in the secondary sector whilst a significantly low portion of the population is employed in the primary sector (2%) (Stats SA, 2011). These trends coincide with the findings that the Thembisile Hani LM is mainly driven by the tertiary sector; hence, the sector also provides most of the employment opportunities.

Although the Thembisile Hani LM is largely a service economy, over the 2005-2015 period; the total employment offered by tertiary sector has shown a slight but positive increase as it increased from a growth of 3% to 5%. Within the primary sector; however, the agriculture industry has employed the most number of people, as it experienced a more significant growth and has increased from 18% employment in the year 2005 to 28% employment contribution in 2005. The mining and quarrying subsector however, has shown fluctuating growth patterns and because of that, has fluctuated from a negative employment contribution of -6% to 5%.

4. ACCESS TO SERVICES AND STATE OF THE LOCAL BUILT ENVIRONMENT

Access to shelter, water, electricity, sanitation, and other services are indicators that assist in determining the standard of living of the people in the area under investigation. Infrastructure and the state of local infrastructure is another indicator to contemplate when considering living standards. The availability of social and economic infrastructure including roads, educational facilities, and health facilities further indicates the nature of the study area, which is valuable in developing a complete profile of the circumstances in which communities are living. These measurements create a baseline against, which the potential impacts of the proposed project can be assessed.

4.1 Settlement profile

The Thembisile Hani Local Municipality (THLM) IDP describes the municipality as a semi-urban local municipality with 32 wards and consisting of 57 villages within which are five established townships. More than two thirds (69.9%) of the local population reside in rural villages with 28.5% living in urban settlements and the remaining 1.6% residing on farm homesteads.

Overall, the average population density for the Municipality is 130 people per square kilometre. KwaMhlanga town which consists of the urban area (known as KwaMhlanga) and the rural area (KwaMhlanga Crossroads) is characterised by a high population density. KwaMhlanga houses 1 029.1 people per square kilometre while the population density in KwaMhlanga Crossroads is 2 421.4 people/km². The spatial structure of KwaMhlanga is characterised with a business core branching out along the main roads surrounded by a strong residential component. The node also enjoys very good access and visibility from two provincial roads, namely the R573 and R568. All this points to good access to economic activities.

4.2 Access to Housing and Basic Services

4.2.1 Housing

INFORMATION BOX: DWELLING TYPES

- Formal housing is made up of the following dwelling types: dwelling or brick structure on separate stand, flat or apartment, town/cluster/semi-detached house, unit in retirement village and room or flatlet on a larger property.
- Informal housing consists of: informal dwelling or shack in backyard, informal dwelling or shack in informal settlement, dwelling or house/flat/room in backyard and caravan or tent.
- Traditional dwelling is defined as a traditional dwelling/hut/structure made from traditional materials.

According to the 2011 National Census, 84.5% of households in the TLM were living in formal brick structures. In KwaMhlanga and KwaMhlanga Crossroads, 99.4% and 85.6% of the households lived in formal structures, respectively. It follows that KwaMhlanga Crossroads has the highest number of households living in informal structures – 12.7% of households, compared to the 0.6% in KwaMhlanga and 11.7% in the LM. Overall, 3.8% of the households in the LM reside in traditional dwellings.

A housing backlog is evident from the number of informal dwellings recorded during the Census 2011; however, there are no recent statistics to gauge whether this backlog has been addressed. The Thembisile LM IDP also highlights lack of housing as a challenge within the municipality. Only one housing programme, which entails providing 100 rural housing units in KwaMhlanga/Tweefontein, is mentioned. The programme has a budget of about R10.3 million and is to be funded by the Department of Human Settlements.

4.2.2 Water

Overall, 88.4% of the households in the municipality have access to piped water in their dwellings or inside their yards. A further 7% access piped water from a communal stand,

while 4.6% of the municipality's households have no access to piped water. In KwaMhlanga, slightly more households have access to piped water inside their dwelling/yard (KwaMhlanga (99.8%) and KwaMhlanga Crossroads (91.6%)). Furthermore, only 0.2% and 4.3% of the households in KwaMhlanga and KwaMhlanga Crossroads, respectively, have no access to piped water.

According to the municipality's IDP, the Municipality does not have a water source and mainly depends on other Water Service Authorities for the supply of bulk water which is not always consistent. Furthermore, water supply shortages occur during the summer season when higher water demands and usages are experienced. In addition to inconsistent supply, other supply challenges include, asbestos bulk water supply pipelines reaching their lifespan, vandalism of water infrastructure, air valve leakages, theft of manhole chamber covers and the lack of awareness on water usage/conservation (Thembisile Hani Local Municipality, 2016).

The IDP acknowledges that the current water provision backlog is 10 022 households. The municipality has budgeted approximately R35 million for various interventions to address the backlog. However only 2 096 households will benefit from these interventions which means a beneficiary shortfall of 7 926.

4.2.3 Access to sanitation

The most common sanitation system in the THLM is pit latrine, which is used by more than three quarters (85.2%) of households. Only 10% of households in the municipality have access to a flush toilet, while 2.6% of families have no access to toilet facilities and 0.9% are still reliant on the bucket system. The picture is markedly better in KwaMhlanga, where 99.5% of households have access to flush toilets. The situation in KwaMhlanga Crossroads mirrors that of the local municipality with 82.2% of the households using pit latrines, while only 10.8% of the households have flush toilets and 3.1% have no access to toilet facilities.

The Municipality's IDP notes that a substantial quantity of the population is without adequate sanitation infrastructure and is serviced below RDP standards. If not managed and provided adequately, the basic need of sewerage and sanitation can pose serious health and safety risks to the communities not receiving these basic services. The sanitation backlog is estimated at 66 317 households per the THLM IDP. The following sanitation service related projects are planned with an estimated total cost of R21.2 million to be sourced from MIG:

- » Luthuli Waste Water Treatment Works (R12.1 million)
- » Upgrading of Waste Water Treatment Works in Tweefontein K (R7.5 million)
- » KwaMhlanga and Tweefontein K Waste Water Purification (R1.6 million)

4.2.4 Access to electricity

The indicator "electricity for lighting", was used as a proxy for measuring households' access to electricity. It is estimated that 92.3% of the households in the local municipality have access to electricity for lighting with 99.7% and 95.4% in KwaMhlanga and KwaMhlanga Crossroads, respectively. The main alternative source for lighting in the study areas was candles: 6% of households in the LM used candles for lighting, while none of

the households in KwaMhlanga relied on candles and 4% of households in KwaMhlanga Crossroads used candles for lighting.

Eskom is both the electricity service authority and service provider for electricity infrastructure and house connections while the municipality is responsible for street lighting and public lighting since the municipality does not have a license to distribute electricity (Thembisile Hani Local Municipality, 2016). Although it appears that there is no major electricity access backlog, land invasion can lead to the creation of informal settlements which could in turn increase the electrification backlog of the municipality. The electricity-related projects planned for the municipality are the installation of high mast and street lights.

4.2.5 Access to refuse removal

Although the Thembisile Hani IDP clearly stipulates that refuse removal as well as disposal sites are the responsibility of the municipality (Thembisile Hani Local Municipality, 2016), this role is not entirely fulfilled as the majority (76,5%) of the individuals indicated that they utilise their own refuse dumps whilst only 4,5% rely on the local authority (municipality) for refuse removal. In KwaMhlanga town however, 98% of the residents indicated that the local authority collects and disposes their refuse once a week (Stats SA, 2011).

4.3 Transport infrastructure

The transport sector plays an essential role in meeting the objectives of economic development, access to employment opportunities and social infrastructure. Vehicle ownership in the local municipality is limited, thus, the majority of people walk or use public transport. Apart from the bus service, which serves the community along R573 as well as a secondary public transport road network which runs through the different settlements, there is also an extensive taxi service in the Thembisile Hani Municipal area. The taxi service is especially concentrated around six different taxi ranks, namely KwaMhlanga (Phola Park), Vlakraagte 2, Enkeldoornoog B, Kwaggafontein, Mathys Zyn Loop and Verena (Thembisile Hani Local Municipality, 2016).

The local municipality's road network is well developed. The most prominent linkage between Thembisile Hani and the surrounding municipal areas is along route R573 (the Moloto Road) in a south-westerly direction towards Tshwane. It is estimated that in excess of 25 000 people commute along this road to Tshwane on a daily basis. The main mode of transport in this regard is by bus. This route also carries the highest number of vehicles in the municipality, and as a result, has developed into an "activity spine" around which the majority of residential, industrial and business development of the municipality has established during the past few years (Thembisile Hani Local Municipality, 2016). There are however, also many negative aspects associated with this commuter route, these include; a high number of accidents and the large amount of time and money spent by commuters daily to reach their place of work, which makes the system highly inefficient.

Upon the realisation of the commuter transport challenge, the Moloto Rail Corridor initiative was established. This would entail the replacement of the current bus commuter

system with a rail commuter system with the objective of providing safer, whilst buses and taxis will be part of the feeder system to the Moloto Rail Corridor (Thembisile Hani Local Municipality, 2016). The planned rail corridor will comprise of 198km railway and will serve the Thembisile Hani LM as well as the Dr. JS Moroka LM.

4.4 Social and recreational infrastructure

The availability of social infrastructure, which includes educational, social and health facilities, police stations, recreational and sports facilities, is key to a community's welfare and ability to develop sustainably.

As far as **educational facilities** are concerned: there are 77 primary schools, 22 combined schools, 46 secondary schools, 21 pre-schools and 7 tertiary institutions. It appears that there is a surplus of schools in terms of national standards in the municipal area (Thembisile Hani Local Municipality, 2016). The municipal IDP highlights that due to the number of existing schools, more efforts should rather be put into improving and maintaining the existing facilities than to create new ones.

Healthcare in the local municipality is provided for by one hospital, six 24-hour community health centres, 14 clinics and four mobile clinics. Although the municipality is fairly well served with health facilities, limited resources make it difficult to ensure that all the communities are provided with the minimum acceptable levels of health services. Another issue is that most of the clinics do not provide a 24-hour service due to lack of staff and resources.

There are seven police stations that cater to the municipality's **security and safety** needs. Five of these police stations are located or clustered in the Moloto, KwaMhlanga, Vlaklaagte and Enkeldoornoog area. The other two police stations are in Verena and Kwaggafontein. However, not all areas within the municipality have access to police stations.

The **sports and recreational facilities** available to the community consist of only two stadiums; namely, Solomon Mahlangu and Kwaggafontein stadium located in KwaMhlanga and Kwaggafontein, respectively. Due to the lack of a tariff policy on the usage of municipal assets; these facilities are underutilised (Thembisile Hani Local Municipality, 2016). Other facilities, which include athletic and soccer fields, exist within the municipal area. Some of the challenges related to sports and recreation in the LM are listed below (Thembisile Hani Local Municipality, 2016):

- » Lack of access to sporting facilities by the local community;
- » Sport committees at ward level exist but are not dysfunctional;
- » There is a need for community gymnasium to encourage the wellness of community;
- » Lack of a funding model for the naming, renaming and signage of geographical features, streets, heritage sites and settlements;
- » Heritage sites and tourist attraction sites in the municipality are not formalised and promoted; and
- » Poor promotion of heritage sites, iconic structures and monuments.

There are five **libraries** in the Municipality in Kwaggafontein, Tweefontein, Verena, Boekenhouthoek and Loopspruit. The main library in Kwaggafontein requires upgrades as it is dilapidated. The municipal library in Tweefontein requires maintenance on a regular basis and a service provider was appointed to construct libraries in Verena and Boekenhouthoek, while the library in Loopspruit is a mobile container (Thembisile Hani Local Municipality, 2016).

5. EVALUATION OF POTENTIAL IMPACTS

The potential Location and Regional impacts during the construction and operational phase as well as the cumulative impacts that are to be investigated in the next study are listed below:

5.1 Local and Regional impacts and issues to be investigated during the construction phase:

Impact: Impact on balance of payment due to possibility that certain equipment and machinery will be imported.			
Desktop analysis sensitivity of the site: The national economy will be most affected by this.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Balance of payment	An increase in the imports of a country often means that more revenue is lost than gained.	National	None
Description of expected significance of impact:			
<i>Probability</i>		Probable	
<i>Duration</i>		Medium term	
<i>Consequence (magnitude)</i>		Very high	
Significance		Medium	
Status (Positive or negative)		Negative	
<i>Reversibility</i>		Partly reversible	
<i>Irreplaceable loss of resources?</i>		No	
<i>Can impacts be mitigated?</i>		Yes	
Gaps in knowledge and recommendations for further study:			
<ul style="list-style-type: none"> Conduct an investigation during the EIA phase to understand the extent to which some of the equipment and machinery will be imported. 			

Impact: Temporary increase in production and GDP-R of the national and local economies due to project capital expenditure.			
Desktop analysis sensitivity of the site: The national and local economies will likely benefit from this.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas

Increase in production and GDP-R of national and local economy	The impact takes place due to the investment on the project that will be spent in the country. It also includes indirect and induced effects created when other suppliers of goods and services to the project experience and increase in demand for their products.	National	None
Description of expected significance of impact:			
<i>Probability</i>		Highly Probable	
<i>Duration</i>		Medium term	
<i>Consequence (magnitude)</i>		Very high	
<i>Significance</i>		High	
Status (Positive or negative)		Positive	
<i>Reversibility</i>		Irreversible	
<i>Irreplaceable loss of resources?</i>		No	
<i>Can impacts be mitigated?</i>		Yes	
Gaps in knowledge and recommendations for further study:			
<ul style="list-style-type: none"> • During the EIA phase, conduct a study to understand current economic base and how a project like this one will contribute to it. • CAPEX figures will be required to calculate the project's impact on production and GDP. 			

Impact: Temporary creation of employment in the local communities and elsewhere in the country.

Desktop analysis sensitivity of the site: People from the THLM and nearby settlements will most likely be affected by this impact.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Employment creation	Creation of direct new job opportunities related to the construction of the proposed H2 Energy Power Station and employment opportunities that will be indirectly created through the increased expenditure in sectors supplying goods and services to the construction activity.	Local economies	None
Description of expected significance of impact:			
<i>Probability</i>		Highly Probable	
<i>Duration</i>		Medium term	
<i>Consequence (magnitude)</i>		High	
<i>Significance</i>		Medium	
Status (Positive or negative)		Positive	

<i>Reversibility</i>	Reversible
<i>Irreplaceable loss of resources?</i>	No
<i>Can impacts be mitigated?</i>	Yes
Gaps in knowledge and recommendations for further study:	
<ul style="list-style-type: none"> Conduct an investigation during the EIA phase to understand the current employment levels in the surrounding area and the impact the jobs created during the construction phase will have on this. 	

Impact: Skills development due to creation of new employment opportunities.

Desktop analysis sensitivity of the site: This impact will affect individuals benefitting from the employment opportunities, that is people from the THLM and nearby settlements.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Skills development	The establishment of a coal-fired power station requires the services of a large number of workers for the duration of the construction period who will acquire new or improve already existing skills.	Local economies	Not applicable to impact

Description of expected significance of impact:

<i>Probability</i>	Highly Probable
<i>Duration</i>	Permanent
<i>Consequence (magnitude)</i>	High
<i>Significance</i>	High
Status (Positive or negative)	Positive
<i>Reversibility</i>	Irreversible
<i>Irreplaceable loss of resources?</i>	No
<i>Can impacts be mitigated?</i>	Yes

Gaps in knowledge and recommendations for further study:

- Conduct a survey primarily focused on understanding the current skills base in the area.

Impact: Improved standards of living of households directly or indirectly benefitting from created employment.

Desktop analysis sensitivity of the site: Households within THLM and surrounding settlements.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Improved standard of living	The construction of the H2 Energy Power Station will result in creation of employment opportunities and various infrastructure	Local economies	None

	developments which will contribute to a reduction in poverty levels and increase in social development.		
Description of expected significance of impact:			
<i>Probability</i>	Highly Probable		
<i>Duration</i>	Medium term		
<i>Consequence (magnitude)</i>	High		
<i>Significance</i>	Medium		
Status (Positive or negative)	Positive		
<i>Reversibility</i>	Partly reversible		
<i>Irreplaceable loss of resources?</i>	No		
<i>Can impacts be mitigated?</i>	Yes		
Gaps in knowledge and recommendations for further study:			
<ul style="list-style-type: none"> Conduct interviews with relevant key stakeholders and relevant community members to understand how the project will impact their living standards. 			

Impact: Temporary increase in government revenue due to the establishment of the power station.

Desktop analysis sensitivity of the site: National government will be the main beneficiary.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Increase in government revenue	The impact will take place as a result of domestic spending on construction activities and will be acquired by government through indirect and direct taxes on the project's activity.	National	Not applicable to impact

Description of expected significance of impact:

<i>Probability</i>	Highly probable
<i>Duration</i>	Medium term
<i>Consequence (magnitude)</i>	Moderate
<i>Significance</i>	Medium
Status (Positive or negative)	Positive
<i>Reversibility</i>	Irreversible
<i>Irreplaceable loss of resources?</i>	No
<i>Can impacts be mitigated?</i>	No

Gaps in knowledge and recommendations for further study:

- During the EIA phase, assess the likely contribution that can be potentially acquired from the establishment of the project.

Impact: Change in demographics of the areas due to influx of workers and job seekers.

Desktop analysis sensitivity of the site: The THLM and specifically KwaMhlanga.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Change in demographics	The construction activities will attract job seekers and will involve the migration of construction workers to the site.	Local economies	None
Description of expected significance of impact:			
<i>Probability</i>		Highly Probable	
<i>Duration</i>		Medium term	
<i>Consequence (magnitude)</i>		High	
<i>Significance</i>		Medium	
Status (Positive or negative)		Positive	
<i>Reversibility</i>		Partly reversible	
<i>Irreplaceable loss of resources?</i>		No	
<i>Can impacts be mitigated?</i>		Yes	
Gaps in knowledge and recommendations for further study:			
<ul style="list-style-type: none"> Consult with local authorities during EIA phase so as to understand change in dynamics that occur as a result of the construction of a new project such as this one. 			

Impact: Increase in social pathologies associated with the influx of migrant labourers and job-seekers to the area

Desktop analysis sensitivity of the site: The THLM and nearby settlements such as KwaMhlanga.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Increase in social pathologies	Activities in the construction phase will attract job-seekers and will involve the migration of construction workers to either the site or the surrounding town. The increase in the number of construction workers is expected to cause a further increase in social pathologies.	Local economies	None applicable to impact
Description of expected significance of impact:			
<i>Probability</i>		Highly probable	
<i>Duration</i>		Medium term	
<i>Consequence (magnitude)</i>		Moderate	
<i>Significance</i>		Medium	
Status (Positive or negative)		Positive	
<i>Reversibility</i>		Partly reversible	
<i>Irreplaceable loss of resources?</i>		No	
<i>Can impacts be mitigated?</i>		Yes	

Gaps in knowledge and recommendations for further study:

- Conduct interviews with relevant community stakeholders to understand the driving forces behind the increase in social pathologies as well as the dynamics that occur as a result of the construction of a new place.

Impact: Added pressure on basic services and social and economic infrastructure

Desktop analysis sensitivity of the site: The THLM and nearby settlements such as KwaMhlanga.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Pressure on basic services	The influx of jobseekers in the area will result in an increased demand for basic services, as well as social and economic infrastructure in the area. This will put pressure on the local municipality to ensure that the existing services are not further deteriorated	Surrounding area	None applicable to impact

Description of expected significance of impact:

<i>Probability</i>	Highly Probable
<i>Duration</i>	Medium term
<i>Consequence (magnitude)</i>	Moderate
<i>Significance</i>	Medium
Status (Positive or negative)	Negative
<i>Reversibility</i>	Partly reversible
<i>Irreplaceable loss of resources?</i>	No
<i>Can impacts be mitigated?</i>	Yes

Gaps in knowledge and recommendations for further study:

- Engage with local authorities during EIA phase to understand the pressure placed upon basic services by an influx of migrant workers

5.2 Local and Regional impacts to be investigated during the operational phase:

Impact: Sustainable increase in production and GDP-R of the national and local economies through operation and maintenance of activities.

Desktop analysis sensitivity of the site: The national and local economies will likely benefit from this.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
GDP-R; total value of final goods and	Once the facility is operational, it will contribute electricity to the	National	None

services produced within a country within a year	national grid and in the process, will receive increased profit revenue.		
Description of expected significance of impact:			
<i>Probability</i>		Highly Probable	
<i>Duration</i>		Permanent	
<i>Consequence (magnitude)</i>		High	
<i>Significance</i>		High	
Status (Positive or negative)		Positive	
<i>Reversibility</i>		Irreversible	
<i>Irreplaceable loss of resources?</i>		No	
<i>Can impacts be mitigated?</i>		No	
Gaps in knowledge and recommendations for further study:			
<ul style="list-style-type: none"> • During the EIA phase, conduct a study to understand current economic base and how a project like this one will contribute to it. • OPEX figures will be required to calculate the project's impact on production and GDP. 			

Impact: Creation of long term employment in the local and national economies through operation and maintenance of activities.			
Desktop analysis sensitivity of the site: A limited number of local will likely benefit.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Long term employment creation	Creation of job opportunities related to the operation of the proposed H2 Energy Power Station	National	None
Description of expected significance of impact:			
<i>Probability</i>		Definite	
<i>Duration</i>		Permanent	
<i>Consequence (magnitude)</i>		High	
<i>Significance</i>		Medium	
Status (Positive or negative)		Positive	
<i>Reversibility</i>		Barely reversible	
<i>Irreplaceable loss of resources?</i>		No	
<i>Can impacts be mitigated?</i>		Yes	
Gaps in knowledge and recommendations for further study:			
<ul style="list-style-type: none"> • Need to engage with project proponent to understand the actual impact on job creation. 			

Impact: Skills development due to the creation of new sustainable employment opportunities
Desktop analysis sensitivity of the site: A limited number of local will likely benefit.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Skills development	The establishment of a coal-fired station requires the services of a large number of workers for the duration of the operation period, in the process workers will be utilising new and acquired skills or adding to skills previously acquired.	National	None
Description of expected significance of impact:			
<i>Probability</i>		Highly Probable	
<i>Duration</i>		Long term	
<i>Consequence (magnitude)</i>		High	
<i>Significance</i>		Medium	
Status (Positive or negative)		Positive	
<i>Reversibility</i>		Irreversible	
<i>Irreplaceable loss of resources?</i>		No	
<i>Can impacts be mitigated?</i>		Yes	
Gaps in knowledge and recommendations for further study:			
<ul style="list-style-type: none"> Detailed socio-economic impact study during EIA phase to determine skills development opportunities. 			

Impact: Improved standard of living of households directly or indirectly benefiting from created employment opportunities.

Desktop analysis sensitivity of the site: Households within THLM and surrounding settlements.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Improved standard of living	During the operational phase of the project, indirect employment opportunities are created through the provision of services such as transport as well as accommodation which indirectly improves the living standards of the locals.	Local economies	None
Description of expected significance of impact:			
<i>Probability</i>		Highly Probable	
<i>Duration</i>		Long term	
<i>Consequence (magnitude)</i>		High	
<i>Significance</i>		Medium	
Status (Positive or negative)		Positive	
<i>Reversibility</i>		Partly reversible	
<i>Irreplaceable loss of resources?</i>		No	
<i>Can impacts be mitigated?</i>		Yes	

Gaps in knowledge and recommendations for further study:

- Further investigation with regards to the impact of similar existing projects on the standard of living of residents to be conducted during EIA phase.

Impact: Increase in government revenue stream.

Desktop analysis sensitivity of the site: National government will be the main beneficiary.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Increase in government revenue	The impact will take place as a result of domestic spending on construction activities and will be acquired by government through indirect and direct taxes on the project's activity.	National	None

Description of expected significance of impact:

Probability Highly Probable

Duration Long term

Consequence (magnitude) High

Significance High

Status (Positive or negative) Positive

Reversibility Irreversible

Irreplaceable loss of resources? No

Can impacts be mitigated? No

Gaps in knowledge and recommendations for further study:

- Further investigation with regards to the impacts of similar existing projects on the government revenue stream to be conducted during EIA phase.

Impact: Investment in local community and economic development projects.

Desktop analysis sensitivity of the site: The THLM and local communities will likely benefit from this impact.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Investment in local community	Project owners are required by the DoE to allocate a certain percentage of the projects' revenue towards community development	Local economies	None applicable to impact

Description of expected significance of impact:

Probability Definite

Duration Long term

Consequence (magnitude) High

Significance Medium

Status (Positive or negative) Positive

<i>Reversibility</i>	Irreversible
<i>Irreplaceable loss of resources?</i>	No
<i>Can impacts be mitigated?</i>	Yes
Gaps in knowledge and recommendations for further study:	
<ul style="list-style-type: none"> An investigation on the efficiency of the local community investment to be conducted during the EIA phase to understand the impact on the communities' standard of living 	

Impact: Potential losses of sustainable revenue by local farming and/or tourism activities due to various environmental impacts

Desktop analysis sensitivity of the site: Directly affected and adjacent farm portions.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Loss of revenue	In the event that nearby farmers or tourism activities are concentrated close to the project site, the daily operation of the farms as well as tourism activities could be compromised	Local economies	Affected farm portions or eco-tourism sites

Description of expected significance of impact:

<i>Probability</i>	Improbable
<i>Duration</i>	Medium
<i>Consequence (magnitude)</i>	Low
<i>Significance</i>	Low
Status (Positive or negative)	Negative
<i>Reversibility</i>	Irreversible
<i>Irreplaceable loss of resources?</i>	No
<i>Can impacts be mitigated?</i>	Yes

Gaps in knowledge and recommendations for further study:

- An investigation on the directly affected as well as adjacent farm areas to be conducted during EIA Phase

Impact: Altered sense of place.

Desktop analysis sensitivity of the site: Immediate zone of influence.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Possible alteration in sense of place	The sense of place is created through the interactions of several characteristics over a certain period of time.	Local Economies	None

Description of expected significance of impact:

<i>Probability</i>	Highly Probable
<i>Duration</i>	Long term

<i>Consequence (magnitude)</i>	Moderate
<i>Significance</i>	Medium
Status (Positive or negative)	Negative
<i>Reversibility</i>	Reversible
<i>Irreplaceable loss of resources?</i>	No
<i>Can impacts be mitigated?</i>	Yes
Gaps in knowledge and recommendations for further study:	
<ul style="list-style-type: none"> During the EIA phase, investigate mitigations proposed by specialists regarding visual, noise and air pollution during the operational phase of the coal-fired power station 	

Impact: Impact on the local tourism industry.

Desktop analysis sensitivity of the site: Individuals/entities engaging in tourism activities.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Tourism industry	More often than not, the tourism industry is often sensitive as tourists are to highly susceptible to changes in the sense of place, aesthetics and "wild Africa".	Surrounding area	None

Description of expected significance of impact:

<i>Probability</i>	Probable
<i>Duration</i>	Moderate
<i>Consequence (magnitude)</i>	Moderate
<i>Significance</i>	Low
Status (Positive or negative)	Negative
<i>Reversibility</i>	Reversible
<i>Irreplaceable loss of resources?</i>	Yes
<i>Can impacts be mitigated?</i>	Yes

Impact: Electricity generated and fed into the national electricity grid

Desktop analysis sensitivity of the site: The national economy will most likely be affected by this.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Electricity generation	Once the H2 Power Station is fully operational, the generated electricity will feed into and supplement the national electricity grid.	National	None

Description of expected significance of impact:

<i>Probability</i>	Definite
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<i>Duration</i>	Permanent
<i>Consequence (magnitude)</i>	Very High
<i>Significance</i>	High
Status (Positive or negative)	Positive
<i>Reversibility</i>	Irreversible
<i>Irreplaceable loss of resources?</i>	No
<i>Can impacts be mitigated?</i>	No
Gaps in knowledge and recommendations for further study:	
<ul style="list-style-type: none"> In the EIA phase, investigation needs to be conducted to understand the extent of the contribution of the Power Station to the national electricity grid 	

5.3 Cumulative Impacts

Nature: Impact on balance of payment due to possibility that certain equipment and machinery will be imported		
	Cumulative Contribution of Proposed Project	Cumulative Impact without Proposed Project
Extent	National	National
Duration	Medium	Very short
Magnitude	Moderate	Low
Probability	Probable	Improbable
Significance	Medium	Low

Nature: Temporary increase in production and GDP-R of the national and local economies due to project capital expenditure		
	Cumulative Contribution of Proposed Project	Cumulative Impact without Proposed Project
Extent	National	National
Duration	Medium	Short
Magnitude	Moderate	Low
Probability	Probable	Improbable
Significance	Medium	Low

Nature: Temporary creation of employment in the local communities and elsewhere in the country.		
	Cumulative Contribution of Proposed Project	Cumulative Impact without Proposed Project
Extent	Local economies	Local economies
Duration	Medium	Short duration
Magnitude	High	Moderate
Probability	Highly Probable	Probable
Significance	High	Medium

Nature: Skills development due to creation of new employment opportunities.

	Cumulative Contribution of Proposed Project	Cumulative Impact without Proposed Project
Extent	Local economies	Local economies
Duration	Long term	Very short
Magnitude	High	Low
Probability	Highly Probable	Improbable
Significance	High	Low

Nature: Improved standards of living of households directly or indirectly benefitting from created employment.

	Cumulative Contribution of Proposed Project	Cumulative Impact without Proposed Project
Extent	Local economies	Local economies
Duration	Long term	Medium
Magnitude	High	Moderate
Probability	Highly Probable	Probable
Significance	High	Medium

Nature: Temporary increase in government revenue due to the establishment of the power station.

	Cumulative Contribution of Proposed Project	Cumulative Impact without Proposed Project
Extent	National	National
Duration	Medium	Short
Magnitude	High	Moderate
Probability	Probable	Improbable
Significance	Medium	Low

Nature: Change in demographics of the areas due to influx of workers and job seekers.

	Cumulative Contribution of Proposed Project	Cumulative Impact without Proposed Project
Extent	Local economies	Local economies
Duration	Medium	Very short
Magnitude	High	Moderate
Probability	Highly Probable	Probable
Significance	High	Medium

Nature: Increase in social pathologies associated with the influx of migrant labourers and job-seekers of the area.

	Cumulative Contribution of Proposed Project	Cumulative Impact without Proposed Project
Extent	Local economies	Local economies
Duration	Long term	Medium
Magnitude	High	Moderate
Probability	Highly Probable	Probable
Significance	High	Medium

Nature: Added pressure on basic services and social and economic infrastructure.

	Cumulative Contribution of Proposed Project	Cumulative Impact without Proposed Project
Extent	Local economies	Local economies
Duration	Long term	Medium
Magnitude	High	Moderate
Probability	Highly Probable	Probable
Significance	High	Low

Nature: Investment in the local community and economic development projects.

	Cumulative Contribution of Proposed Project	Cumulative Impact without Proposed Project
Extent	Local economies	Local economies
Duration	Long term	Medium
Magnitude	High	Moderate
Probability	Highly Probable	Probable
Significance	High	Medium

Nature: Potential losses of sustainable revenue by local farming and/or tourism activities due to various environmental impacts.

	Cumulative Contribution of Proposed Project	Cumulative Impact without Proposed Project
Extent	Local economies	Local economies
Duration	Medium	Short
Magnitude	Moderate	Minor
Probability	Probable	Improbable
Significance	Medium	Low

Nature: Altered sense of space

	Cumulative Contribution of Proposed Project	Cumulative Impact without Proposed Project
Extent	Local economies	Local economies

Duration	Medium	Short
Magnitude	Moderate	Low
Probability	Probable	Improbable
Significance	Medium	Low

Nature: Impact on the local tourism industry		
	Cumulative Contribution of Proposed Project	Cumulative Impact without Proposed Project
Extent	Local economies	Local economies
Duration	Medium	Very short
Magnitude	Minor	Small
Probability	Improbable	Very improbable
Significance	Low	Low

Nature: Electricity generated and fed into the national electricity grid.		
	Cumulative Contribution of Proposed Project	Cumulative Impact without Proposed Project
Extent	National	National
Duration	Permanent	Very short
Magnitude	Very High	Minor
Probability	Definite	Very Improbable
Significance	High	Low

6. CONCLUSION

The proposed development of the H2 Energy Power Station and associated infrastructure is to be located 9km south from KwaMhlanga town, approximately 800m north from the Palesa Coal Mine in the Thembisile Hani LM of the Nkangala DM, Mpumalanga.

In consideration of the information documented within the baseline profile of the Thembisile Hani LM as well the policy review, it is evident that the proposed project can bring much needed investment into the area to revitalise local economies and provide the residents with jobs and sustainable income. The unemployment rate in the Thembisile Hani LM is relatively high and developments such as the one proposed by H2 Clean Energy (Pty) Ltd, would bring sustainable jobs for the locals, which could assist in alleviating poverty within the area through the provision of employment opportunities during the construction and operational phase of the project; thus, enabling locals to be active champions of their own development as stated in the NDP.

It will also lead to the development of the supporting industries in the area as well as nearby towns and create an opportunity to revitalise growth in the declining economic sectors; thereby, increasing opportunities for economic development, infrastructural upgrades, improved access to basic services and improve the standards of living and livelihoods of the local people.

Although the review of local and regional policy documents place emphasis on economic stimulation, potentially sensitive sectors such as the tourism and agriculture industries will need to be considered when examining the potential impact of the proposed project on the socio-economic environment.

- » Though it is clear that the policies reviewed largely support the development of a coal-fired project in the area as it could uplift the local economy, the proposed project can potentially restrain the development of the local eco-tourism and agricultural industries due to the possible environmental impacts that it could create.
- » Current land uses in the Nkangala DM consist of mining, agriculture, forestry and built up areas. Although this is the case, the district is primarily dominated by agricultural land use. Crop farming as well as cattle farming are the major enterprises on the southern part of the district. Tourism is also an essential part of the region as the region is strategically located in terms of major tourism opportunities such as the Kruger National Park to the east, Pilgrims rest and Graskop (Nkangala District Municipality, 2015). Similar trends are observed in the Thembisile Hani LM, the land towards the east of Verena is predominantly used by large scale farmers whilst the west of Verena is utilised by local and small scale farmers. Tourism is also said to have a significant potential toward contributing to the local municipal economy. In the year 2013, tourism contributed 6,4% to the GDP-R of the LM which is equivalent to R350 million injection to the Province (Thembisile Hani Local Municipality, 2016). These points not only highlight the importance of the tourism and agricultural sectors within the LM, but also place emphasis on the need to invest in complementary economic development initiatives to ensure that none of the sectors overlap one another thus stagnating economic growth.

Overall, the following potential site-specific impacts will need to be considered during the next phase of the study:

- * Conflict between land-use for electricity generating purposes and tourism and agricultural activities.
- * Permanent loss of production created by the current economic activities, if any, on the directly affected and adjacent farms.
- * Stock theft and poaching on surrounding farms because of increased access to the site.
- * Deterioration of living and working conditions of site occupant due to various environmental impacts.

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