ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED HUMANSRUS SOLAR THERMAL ENERGY POWER PLANT DEVELOPMENT ON A PORTION OF THE FARM HUMANSRUS 469 NEAR POSTMASBURG, NORTHERN CAPE PROVINCE

May 2011

Socio-Economic Impact Assessment: Scoping Phase Input

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1. INTRODUCTION

Urban-Econ Development Economists was appointed by SSI Engineers and Environmental Consultants to undertake a socio-economic impact assessment study for the proposed construction and operation of the Humansrus Solar Thermal Power Plant or otherwise referred to as a Concentrated Solar Power (CSP) Plant, Postmasburg, Northern Cape. This report presents the socio-economic specialist's input into the scoping phase of the project.

1.1   Project background and description

Economic development and the ability of the national government to alleviate poverty are indirectly reliant on the supply of electricity in South Africa. The Integrated Resource Plan (February 2010) projected that an additional capacity of 41 346 MW will be required to support the average economic growth rate of 4.5% per annum over the next twenty years and ensure adequate reserves. The required expansion is almost two times the size of the existing capacity of the system. A significant component of the above-mentioned plan is, amongst others, the expansion of the use of renewable energy sources to reduce carbon emissions involved in generating electricity and involvement of Independent Power Producers in these projects.

In line with the IRP2010, SolarReserve SA (Pty) Ltd (SolarReserve) proposed the construction of a CSP Plant, to be known as the Humansrus CSP project. The CSP Plant will have an installed capacity of up to 100 MW.

SolarReserve is one of the world's leading companies in the field of renewable energy generation. The renewable energy generation market faces two fundamental problems – (1) scalability and (2) issue of electricity storage. Solar Reserve has managed to bridge these problems with their CSP technology. CSP Plants draw their heat from the sun, an unlimited source of pure clean energy – and unlike wind and photovoltaic, the technology implemented by Solar Reserve can be delivered when it is needed dependent solely on demand and not climatic factors. This feature of the technology allows Solar Reserve to bridge the key barriers pertinent to renewable energy generation – scalability and storage.

The unique components in SolarReserve's power towers are the molten salt storage loop and the power tower central receiver. The molten salt storage loop enables the plant to generate electricity whenever it is needed - 24 hours per day or during "peak demand" periods. Molten salt is an efficient and inexpensive medium to store energy. The salt used in the process is an environmentally friendly mixture of sodium and potassium nitrate, the same ingredients used in garden fertiliser.

1.2   Scope of the study

The purpose of the Socio-Economic Impact Assessment is to determine the potential positive and negative effects of the proposed CSP Plant on the local and regional economies and to compare their effects with the "no go" alternative. The "no go" alternative assumes that the proposed mining operation is not established at the intended location, nor anywhere else in the country. The "no go" alternative 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 inputs into the Scoping Report that is compiled by the Environmental Practitioner. The Scoping Phase inputs address only a portion of the scope of work involved in the Socio-Economic Study. Its purpose is as follows:

- Provide a description of the environment that may be affected by the proposed project; particularly its socio-economic characteristics, and

- Identify the potential impacts to be assessed in the EIA phase.

The scoping report therefore aims at identifying social, socio-economic, and economic issues that will form part of the detailed EIA phase.

1.3   Project's location and study area delineation

The proposed site for the Humansrus CSP Plant is located on a portion of the farm Humansrus No. 469 situated in the Northern Cape Province approximately 30 kilometres north-east of the town of Postmasburg. The site falls within the Tsantsabane Local Municipality (LM), which in turn forms part of the Siyanda District Municipality (DM) - one of the five districts of the Northern Cape Province of South Africa.

Map 1-1: Site location within the Northern Cape Province
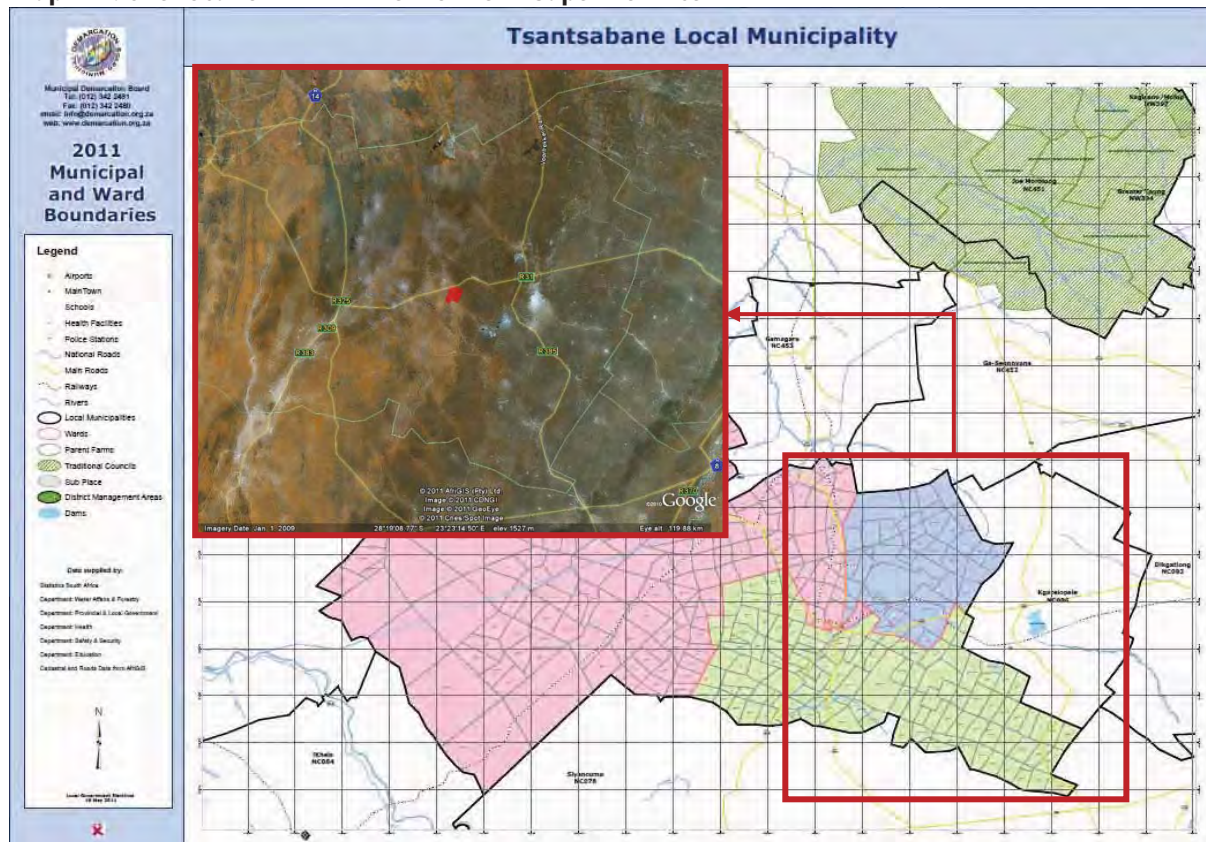
Source: www.demarcation.org.za and Google Map, 2011

In order to delineate the study area, it is important to understand the concept of socio-economic impacts. Socio-economic impacts can be of a different nature and spatial extent. The latter differs significantly depending on the type of activity that is being analysed and the structure and composition of the locality where it is to be established. 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. It is very rare, though, to find a case when the demands of the proposed activity to be constructed and operated can be fully satisfied within the immediate locality of the project. Therefore, more often than not, economic impacts derived from any activity are spread throughout various administrative units. Understanding the potential distribution and concentration of impacts throughout the area is important to determine the magnitude and significance of these impacts in the context of spatial units.

The study area's delineation is usually done in terms of three levels – primary, secondary and tertiary. From a socio-economic impact perspective, the primary study area refers to the locality where the

immediate economic effects of the proposed activity will be observed. This is usually defined considering the actual location of the proposed project, proximity to skilled and unskilled labour, and juxtaposition relative to suppliers. The primary study area is usually relatively small and includes administrative units from where the majority of labour for the proposed project will be supplied and where some parts of the capital and operational budgets will be spent, such as a city, town or LM depending on data availability. The secondary study area is generally far greater than the primary study area. It usually has a relatively diversified economy, which is why it is also characterised as an area where the majority of the domestic expenditure on the project will be distributed. The third tier of a delineated study area is the tertiary study area. From an economic impact perspective, it includes all impacts that would be derived from the project's domestic expenditure.

The proposed project is located within the Siyanda DM area. The closest major town to the site by road is Postmasburg (approximately 30 km). Other towns within 50 kilometres of the proposed site are Danielskuil (approximately 30km) to the north-east and Lime Acres (approximately 27km) to the southeast. It is estimated that most of the people who will be employed by the proposed project will come from the nearby settlements and above-mentioned towns. As far as procurements of services and equipment during construction and operation of the project are concerned, some of these will be sourced from the Northern Cape. Given the fact though that its economy is not diversified, it could be argued that a significant portion of these services will be sourced from the rest of South Africa. Given the above, the following delineation of the study areas is assumed:

- Primary study area includes the site and the Tsantsabane LM;
- Secondary study area includes the Siyanda DM and Northern Cape, and
- Tertiary study area is South Africa.

1.4   Methodology for scoping phase

Given the requirements of the Scoping Phase, a three step methodology was employed to complete it. These included:

- **Introductory chapter.** The introductory chapter focuses on providing the background to the study and the project itself. It also outlines all the assumptions used in the impact modelling exercise;
- **Baseline profiling.** Baseline profiling is the key component of the Scoping Phase input to be provided by the socio-economic specialist. It includes the description of the study area in terms of selected socio-economic variables. This information is used to interpret the socio-economic impacts that could be derived from the project in the context of the local, provincial and national economies. It includes the analysis of parameters such as population size and household numbers, structure and growth of the economy, labour force, employment situation and service delivery. Profiling for the study was done making use of Quantec Research database and selected StatsSA statistics, such as Labour Force Surveys and Community Survey 2007;
- **Identifying the anticipated impacts.** This step includes the identification of the socio-economic impacts that could be expected during the construction and operational phases of the proposed CSP Plant. The list of impacts, inclusive of their nature and extent, represents the impacts that are usually associated with similar projects. Its purpose is to ensure that the specialist study contains a detailed analysis thereof, which means that their list, as well as other characteristics could change from the ones outlined in the Scoping Phase inputs report once the detailed assessment is undertaken; and

- **Reporting.** The data and information gathered during the study was included and presented as part of the Scoping Phase Input Report.

2. BASELINE INFORMATION

This chapter examines key socio-economic characteristics of the study area, as per delineation provided in the previous chapter. This is essential as it provides both qualitative and quantitative data related to the economies under observation. It should be noted that where possible information is provided for 2011, which is an estimate based on the historical trends and available statistics.

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

- Population size and growth;
- Average household size;
- Income and Expenditure patterns;
- Labour Market dynamics;
- Production;
- Gross Domestic Product per Region, and
- Service delivery and access to tenure.

2.1 Population size and growth

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 to 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 as estimated for 2011.

In 2011, South Africa's population is expected to be above 50 million (Table 2-1), with 1.1 million people residing in the Northern Cape area. The Siyanda DM is housing 247 611 people, or 22.5% of the provincial population while the Tsantsabane LM has a population of 29 150 people, i.e. just above 10% of the DM's population.

Table 2-1: Population size (2011) and historical growth rates (1995-2011)

Study area	2011	Historical growth rates			
		1995-2000	2000-2005	2005-2010	1995-2011
South Africa	50 430 328	1.7%	1.3%	1.1%	1.4%
Northern Cape	1 101 318	1.2%	0.4%	0.3%	0.6%
Siyanda DM	247 611	1.4%	0.5%	0.4%	0.8%
Tsantsabane LM	29 150	0.7%	0.9%	1.2%	0.9%

Source: Urban-Econ calculations based on Quantec, 2011

As indicated in the table above, the Compounded Annual Growth Rate (CAGR) of the primary study area's population between 1995 and 2011 was 0.9%. It was higher than the CAGR of the Siyanda DM and the provincial population during the same period, but lower than that of South Africa's population. Whilst the population of the Siyanda DM, Northern Cape and South Africa experienced a slowdown in their growth rates, the primary study area's population growth rate has been increasing (Table 2-1). This could be explained due to the fact that mines constitute a prominent land use in the area, which is home to the Assmang Iron Ore Mine at Beeshoek and the newly established Kolomela under Kumba.

2.2 Household numbers and size

Household data enables a richer interpretation of the results of socio-economic impact analyses. A large increase in household numbers coupled with the increase in disposable income levels result in greater consumption, which in turn stimulate local production and as a result the economy. In addition, knowledge of the size of the study areas in terms of households is useful for interpretation of the magnitude of the economic impact that could be created by the proposed activity.

South Africa have 13 385 517 households, which means that the average household size in the country is 3.8. The Northern Cape is estimated to have above 281 015 households and a bigger average household size than in the country. The Siyanda DM has 61 453 households and the biggest average household size in all of the study areas (4.1). The primary study area is expected to have 7 485 households and almost the same average household size (3.9) as the rest of the Province and country.

Table 2-2: Household numbers (2011), household size (2011) and its historical growth rate (1995-2011)

| Study area	HH number	Average HH size	Household number historical growth rates			
			1995/00	2000/05	2005/10	1995/11
South Africa	13 385 51	3.8	4.0%	2.1%	1.0%	2.3%
Northern Cape	281 015	4.0	3.6%	1.1%	-0.2%	1.5%
Siyanda DM	61 453	4.1	3.5%	1.3%	0.3%	1.7%
Tsantsabane LM	7 485	3.9	2.3%	2.0%	1.8%	2.0%

Source: Urban-Econ calculations based on Quantec, 2011

Over the years, as indicated in Table 2-2, the rates at which the numbers of households in the secondary and tertiary study areas were increasing have been slowing down, which mirrors the trend observed with respect to population dynamics in these study areas. In the primary study area, the trend though was different – with the population growth rate increasing, the household growth rate was also slowing down. When compared with population growth rates, it could be noted that the household growth rate in South Africa was on par with the population growth rate between 2005 and 2010. In the Northern Cape and the Siyanda DM, household growth rates were however significantly lower than their population growth rates, which means that the average household size in these areas has been slightly increasing.

The main factors that affect the household growth include, besides the population increase, the change in age structure and incidence rate, or the likelihood of people of a certain age to start a new household. The significant difference between a household growth rate and a population growth rate, though, is usually attributed to the change in age structure.

Household size is also influenced by many other factors such as culture, traditions, education levels, income levels, etc. Over the years, it has been observed that the size of an average household in the country has been declining (Figure 2-1).

Figure 2-1: Household size dynamics (1995 – 2011)
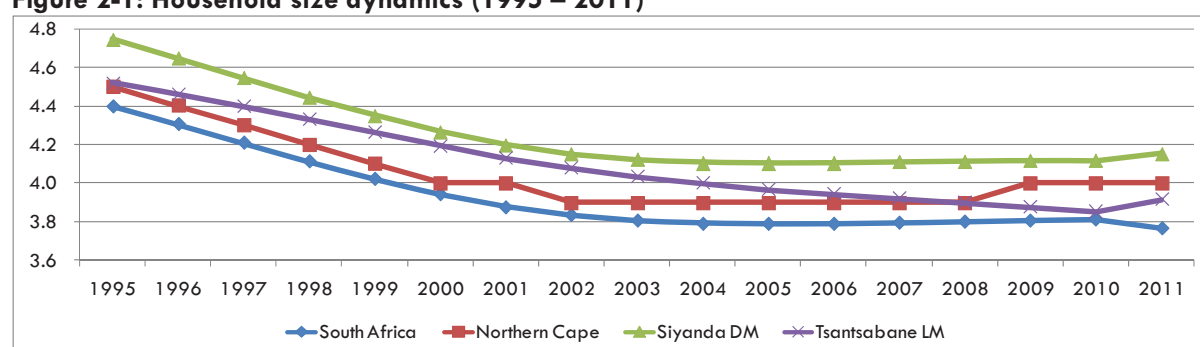
As illustrated in Figure 2-1, the average household size in South Africa in 1995 was 4.4, whilst in 2011 it was 3.8. In the secondary and primary study areas, the average household size also dropped significantly between 1995 and 2011, although it should be noted that in the Northern Cape, the Siyanda DM and the Tsantsabane LM, the average household size was slightly higher than in South Africa. In the last three years, a slight increase in the average household size in all areas is observed, which could suggest that the trend of the sharp decline in the household size observed between 1995 and 2002 has been reversed.

2.3   Income and expenditure patterns

Income distribution is one of the most important indicators of social welfare, as income is a primary means by which people are able to satisfy their basic needs such as food, clothing, shelter, health, services, etc. Changes in income inflict changes in the standard of living, more specifically: a positive change in income can assist individuals, households, communities and countries to improve living standards.

There is a direct linkage between the household expenditure and economic growth. Increase in household expenditure means a greater demand for goods and services, which means an increase in production and positive change in the size of an economy. As has been seen in 2005-2006 in South Africa, robust increase in disposable income coupled with low interest rates in the country stimulated an increase in consumption by households, in particular durable and semi-durable goods, which in turn had a positive impact on the country's economy. Knowledge of the volume of the disposable income and the expenditure patterns of households, therefore, can provide vital intelligence with respect to the sectors that are most dependent on the household income and therefore would be most affected in the case of change in household income.

Table 2-2 shows income distribution in study areas as captured in the Community Survey 2007. More recent data, unfortunately, are not available, whilst historical information is not robust and reliable enough to escalate the latest figures and estimate the situation in 2011 with great confidence.

Based on the 2007 figures it could be concluded that the household income situation mirrored some of the patterns observed in the Northern Cape and in the rest of the country. First of all, the percentage of households earning less than R3 200 per month (R38 400 per annum) in the Tsantsabane LM area was slightly higher than in the Siyanda DM and the Province, but lower than in the rest of the country in 2007. Overall, more than half of households earned less than R3 200 per month in all the study areas and the country in 2007. At the same time, though the percentage of households without any income at all was significantly higher in the primary study area than in any other study area analysed. From an average household income perspective, an average household in the primary study area earned more or less the same as an average household in the Siyanda DM, what means that there are more

households in the Tsantsabane LM with a higher income, but this average household income is significantly less than households in the Northern Cape and South Africa.

Table 2-2: Income distribution (2007)

Income category (per annum)	South Africa		Northern Cape		Siyanda DM		Tsantsabane LM	
No income	8.2%		6.8%		4.9%		11.4%	
R1 - R4 800	5.0%		3.5%		2.0%		3.1%	
R4 801 - R9 600	9.0%	60.2%	7.9%	58.2%	9.3%	57.9%	7.9%	59.4%
R9 601 - R19 200	18.9%		20.2%		22.1%		16.7%	
R19 201 - R38 400	19.1%		19.8%		19.6%		20.3%	
R38 401 - R76 800	11.4%		13.2%		12.3%		15.3%	
R76 801 - R153 600	7.6%		8.0%		6.8%		8.9%	
R153 601 - R307 200	5.3%		4.7%		3.7%		3.6%	
R307 201 - R614 400	2.8%		2.2%		1.7%		2.5%	
R614 401 - R1 228 800	0.9%		0.6%		0.6%		0.6%	
R1 228 801 - R2 457 600	0.3%		0.2%		0.1%		0.3%	
More than R2 457 600	0.2%		0.2%		0.1%		0.1%	
No response	11.1%		12.6%		16.8%		9.4%	
TOTAL	100%		100%		100%		100%	
Weighted av. (2011 prices)	R8 920		R8 048		R6 938		R6 509	

Source: Urban-Econ calculations based on Community Survey 2007, 2011

Figure 2-2 illustrates the expenditure pattern of households in the study areas. It shows that there are slight differences between expenditure patterns of households in the Tsantsabane LM and other study areas, particularly the Siyanda DM. In the primary study area, households tend to spend the same share of their disposable income on services and non-durable goods, whilst in the Siyanda DM and the Northern Cape households tend to spend more on services than on non-durable goods. The share of disposable income spent by the Tsantsabane LM households on non-durable goods is also greater than the share of expenditure on these goods by households residing in the Siyanda DM, the Northern Cape and the rest of the country. The share of expenditure on durable goods and semi-durable goods is almost similar for all the study areas.

Figure 2-2: Household expenditure per main groups (2008)
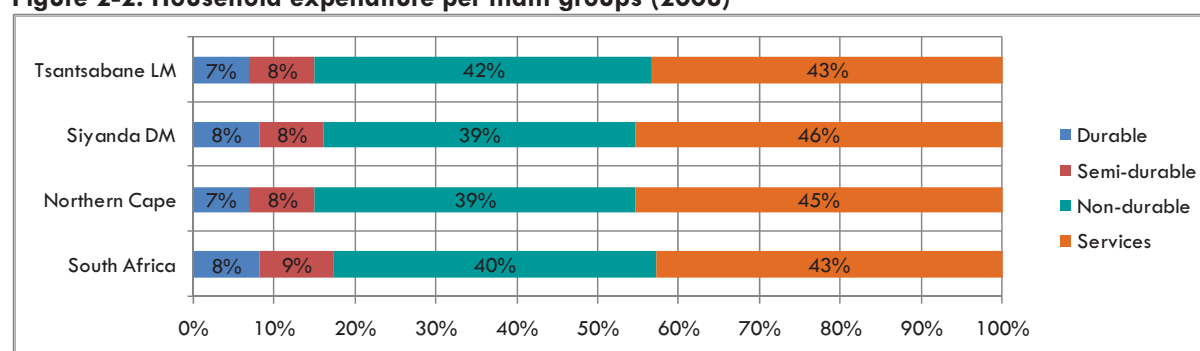
Source: Quantec, 2011

Table 2-3 provides more detailed information on the items that households spend the largest share of their income on.

Table 2-3: Dominant expenditure items (2008)

Expenditure type	South Africa	Northern Cape	Siyanda DM	Tsantsabane LM
Food, beverages and tobacco	26.3%	27.0%	26.4%	28.7%
Rent	12.4%	15.2%	15.3%	15.2%
Transport and communication	9.1%	9.1%	9.3%	8.5%
Medical services	5.9%	5.9%	5.9%	5.6%
Personal transport equipment	4.5%	3.9%	4.0%	3.7%

Expenditure type	South Africa	Northern Cape	Siyanda DM	Tsantsabane LM
Clothing and footwear	5.0%	4.2%	4.1%	4.2%

Source: Quantec, 2011

As indicated in Table 2-3, expenditure on food, beverage, and tobacco products is the largest expenditure item amongst households in all areas, although households in the Tsantsabane LM tend to allocate a slightly bigger share of their income for these expenses than households in the rest of the province and country. Larger portions of the Northern Cape, Siyanda DM and the Tsantsabane LM households' incomes has to be allocated towards paying rent than is the case of households in the rest of South Africa. The Tsantsabane LM households also tend to spend a smaller share of their income on transportation than households in the Siyanda DM and the rest of the study areas. Expenditure on personal transport equipment in the primary area is lower than in the secondary and tertiary areas and spending on clothing and footwear is smaller than in South Africa, but the same as in the Northern Cape.

2.4 The labour market

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. 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 angles, including employment rate and sectoral employment patterns.

Information box: Unemployed as per official definition

Unemployed are people, who:
a) Did not work during the seven days prior the interview;
b) Want to work and are available to start work within a week of the interview, and
c) Have taken active steps to look for work or to start some form of self-employment in the four weeks prior to the interview.

The composition of the labour force in the primary study area, Siyanda DM, Northern Cape and the country as reported by the Labour Force Survey is detailed in Table 2-4. Unfortunately, though, since the latest Labour Force survey does not report on the data for the District Municipalities, information for the study areas is sourced from the Quantec database and represents 2009 figures. This allows for a comparison between the study areas.

Table 2–4: Labour force statistics (2009)

Indicators	South Africa	Northern Cape	Siyanda DM	Tsantsabane LM
Working age population	31 496 936	704 615	163 008	18 707
Non-EA	15 131 133	329 386	71 740	7 811
Labour Force	16 365 803	375 229	91 268	10 896
Employed	12 260 902	271 688	68 166	6 851
Unemployed	4 104 901	103 541	23 101	4 044
Unemployment rate	25.1%	27.6%	25.3%	37.1%
LF participation rate	52.0%	53.3%	56.0%	58.2%

Source: Quantec, 2011

In 2009, South Africa had about 31.5 million people within the working age population. Of these, about 15.1 million were non-economically active and 16.4 million formed part of the labour force. This means that the labour force participation rate in the country was 52.0%. The number of the employed

people in South Africa was about 12.3 million, leaving 4.1 million people or 25.1% of the labour force unemployed.

The Northern Cape accounted for 2.3% of the national working age population, or 704 615 people. In 2009, just over 53% of the provincial working age population participated in the economy or were economically active. These people encompassed a labour force, which was divided into 271 688 employed and 103 541 unemployed people, indicating a 27.6% unemployment rate in the province.

Siyanda DM had a bigger percentage of the working age population participating in the economic activities than that of the province and the country. In Siyanda, 56.0% of the working age population were economically active, with a 25.3% of these people being unemployed.

The primary study area had a working age population of 18 707 people and a labour force of 10 896 people, of who only 6 851 were employed. This means that in light of the labour force figure, the unemployment rate in the LM was 37.1% - significantly higher than in the Siyanda DM, the Northern Cape and South Africa. The high labour force participation rate, however, means that a significantly higher percentage of people in the Tsantsabane LM than in all the other study areas were looking for jobs.

2.5   Economic production and GDP-R

Interpretation of economic impacts requires a sound understanding of the size of the economy and its dynamics in the past. A number of indicators exists that can describe the economy of a region or an area. The most common variables that are used for the analysis include production and Gross Domestic Product per Region (GDP-R). The former represents the total value of sales of goods and services, or the turnover of all economic agents in a region; whilst the latter, using the output approach, means the sum of value added created by all residents within a certain period of time, which is usually a year. The trend at which the GDP-R has been changing in the past is also referred to as economic growth indicator. It is a measure of both the performance of an area and the well-being of the citizens of an area. Faster economic growth than population growth is taken as an indicator of a healthy economy and an improvement in citizens' well-being.

Table 2-5 provides an indication of the current estimated production and GDP-R values in the study areas. It shows that business sales in South Africa are expected to amount to R5 603 billion in 2011, in current prices which equates to R2 530 billion of gross value added. The Northern Cape accounted for about 2.0% of the national GDP-R in 2011, whilst the Siyanda DM and the Tsantsabane LM contributed 22.4% and 3.3% to the provincial economy respectively.

Table 2-5: Production and GDP-R figures (2011)

Study area	Production (R'ml)		GDP-R (R'ml)	
	Current prices	CAGR 1995-2010	Current prices	CAGR 1995-2010
South Africa	5 603 076	4.6%	2 530 484	3.3%
Northern Cape	104 039	3.2%	56 341	2.3%
Siyanda DM	23 380	4.2%	11 776	3.0%
Tsantsabane LM	3 476	3.8%	2 106	2.8%

Source: Quantec, 2011

Figure 2-3 illustrates the dynamics of the study areas and their sensitivity to the global and domestic changes in the economies.

Figure 2-3: GDP-R historical trends (1996-2009)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010*	2011*
South Africa	3.8%	2.5%	0.7%	2.6%	4.3%	2.8%	3.7%	3.0%	4.5%	5.3%	5.5%	5.5%	3.8%	-1.5%	3.0%	3.8%
Northern Cape	2.4%	4.3%	2.1%	2.9%	2.2%	-1.7%	1.5%	3.6%	2.3%	3.5%	3.6%	3.6%	2.0%	-0.5%	2.3%	1.6%
Siyanda DM	3.6%	4.9%	1.6%	4.8%	2.6%	-0.1%	2.6%	4.0%	2.8%	7.3%	2.2%	4.3%	3.3%	-1.0%	3.5%	2.4%
Tsantsabane LM	1.4%	4.3%	3.4%	1.7%	2.2%	-2.6%	2.8%	4.9%	2.9%	2.8%	7.2%	4.2%	2.7%	2.0%	-0.3%	3.6%
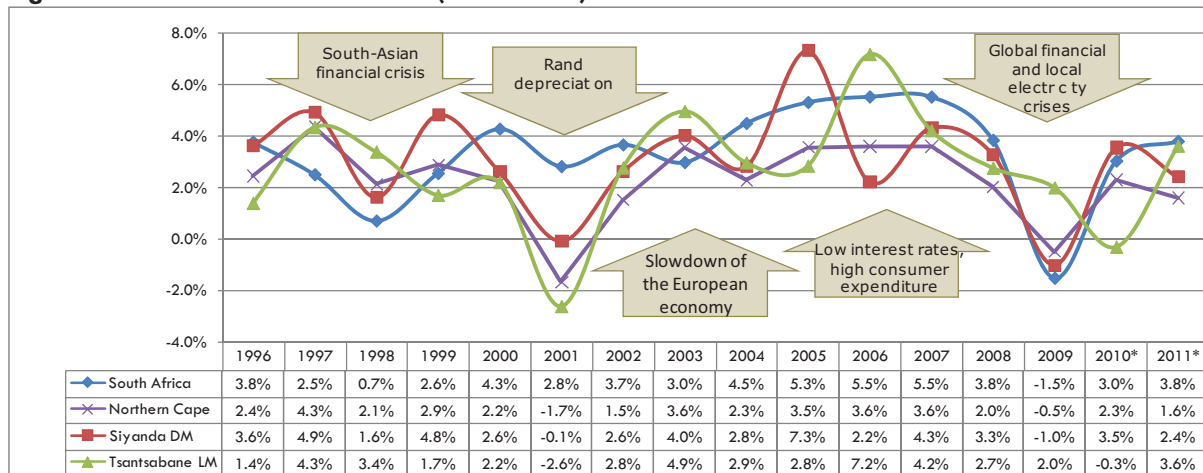
Source: Urban-Econ's calculations based on Quantec, 2011

As illustrated in Figure 2-3, South Africa's economy has been sensitive to the changes on the global and regional arenas. The South Asian financial crisis in 1997-1998, Rand depreciation in 2001, slowdown of the European economy in 2003, and the major global financial and local electricity crises in 2008 all had an influence on the dynamics of the national economy one way or another. It seems that the Rand depreciation in 2001 had a greater effect on the primary and secondary areas, as this were the time when all of them had significantly lower growth rates than South Africa. Fluctuations in the global and regional economies, as well as the spin-off effects of these trends experienced in the country, also affected the growth prospects of provincial, District Municipality's and Local Municipality's economies.

The domestic electricity and global financial crises had a negative impact on the study area's economies in 2009. As illustrated in Figure 2-3, all of the analysed economies contracted, except with the Tsantsabane LM still showing positive growth. This could be explained by the fact that a significant portion of the JT Gaetsewe DM economy comprises of the mining, community and trade industry. The electricity and financial crisis experienced in 2008 had a negative impact on the production volume of the mining industry, therefore the steep decline from 2006. As a result, the size of this industry has shrunk already in 2008. The peak of the aftermath of the global financial crisis reached South Africa in 2009. This coupled with high interest rates and stricter credit policy and had a significant negative impact on the domestic demand. As a result, almost all industries experienced some level of contraction or stagnation which ultimately reduced the demand for their outputs and had a negative impact on their growth. Sectors that continued growing during this period included construction, community and government services, largely due to the investment and activity that took place in preparation for the 2010 World Cup.

The global economy, as well as South Africa's economy, is slowly recovering from the turmoil of the past few years, although it will take a few years before it reaches the level of economic growth that was observed before 2008.

2.6   Structure of economies

The structure of the economy provides 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.

Table 2-6 provides structures of study areas' economies in 2011 illustrating nominal (2011) prices and 2005 prices. It should be noted that the calculation of the structure of the economy in current and constant prices provides different results. This is due to the fact that prices on goods and services do not change proportionally over years. Prices on goods of one sector could grow faster than prices on goods or services in other sectors. The indication of the structure of the economy in basic prices or prices of 2005 as was done in this case illustrates the relative composition of the economy, but excludes the benefits or dis-benefits of that economy that might have been experienced due to price effects. This is why, the presentation of results in nominal prices is also important as it allows the illustration of the economy's structure taking into account the current market prices and therefore the effects thereof on the income or Gross Operating Surplus. The comparison of the structure of the economy in terms of basic and nominal prices also provides valuable insight into the sensitivity of that economy with respect to changes of commodity prices. An economy that generates a significant share of its GDP-R from certain commodities will most likely have a significantly different structure when compared between nominal and basic prices.

Table 2-6: Structure of the study areas' economies in 2011

Sectors	South Africa		Northern Cape		Siyanda DM		Tsantsabane LM		
	2005 prices	Nominal	2005 prices	Nominal	2005 prices	Nominal	2005 prices	Nominal %	Nominal R'ml
Primary sector	**8.2%**	**11.1%**	**29.6%**	**36.7%**	**32.3%**	**40.2%**	**42.0%**	**49.1%**	**1035**
Agriculture, forestry and fishing	2.3%	3.7%	6.6%	8.9%	14.7%	19.6%	1.3%	1.8%	37
Mining and quarrying	5.8%	7.4%	23.0%	27.7%	17.6%	20.7%	40.6%	47.4%	997
Secondary sector	**23.2%**	**23.1%**	**7.3%**	**7.1%**	**10.6%**	**10.0%**	**5.5%**	**5.1%**	**107**
Manufacturing	17.6%	17.2%	3.7%	3.6%	5.7%	5.4%	2.8%	2.7%	56
Electricity, gas and water	2.2%	2.0%	1.9%	1.7%	3.1%	2.8%	2.0%	1.7%	36
Construction	3.5%	3.9%	1.7%	1.7%	1.8%	1.8%	0.7%	0.7%	14
Tertiary sector	**68.6%**	**65.6%**	**63.1%**	**56.3%**	**57.1%**	**49.8%**	**52.5%**	**45.8%**	**965**
Trade	13.7%	13.4%	12.4%	11.3%	14.6%	12.6%	6.5%	5.7%	119
Transport, storage & comm..	10.5%	10.7%	10.5%	10.0%	11.8%	10.8%	17.1%	15.7%	330
Finance, insurance, & business	24.0%	22.8%	15.2%	13.6%	10.8%	9.4%	10.8%	9.4%	197
Com. and gov. services	20.5%	18.9%	25.0%	21.5%	20.0%	16.8%	18.1%	15.1%	318
TOTAL	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**2 106**

Source: Urban-Econ's calculations based on Quantec, 2011

As indicated in Table 2-6, South Africa's economy is a service economy, as the biggest share of its GDP-R is created by tertiary sectors, in particular the finance and business services sector and the community and government services sector. The primary sector that includes agriculture and mining contributes the smallest amount to the national economy, although they are strategically important for ensuring food security in the country and provision of electricity.

The structure of the Northern Cape's economy is entirely different to the composition of the national economy with the tertiary sector accounting for over 60% of its GDP-R and the primary sector playing a prominent role in the economy with just under 30% of its GDP-R. The comparison of the structure of the Northern Cape's economy in basic and nominal terms suggests that price effects have a significant impact on the structure of the economy. This is largely due to the fact that it contains a prominent primary sector, in particular the mining industry, as it is the price of commodities produced by the primary industry that can have a notable effect on the structure of any economy.

The structure of the Siyanda DM's economy is different to that of South Africa, but is quite similar to that of the Northern Cape. It is clear that it is more dependent on the primary and secondary sectors

than that in the province. Because of it, its tertiary sector is smaller than the tertiary sector in the Northern Cape.

The Tsantsabane LM's economy, which generates almost half of its GDP-R from the tertiary sector, also has a different structure with respect to primary and secondary sectors than that of the country's economy. In constant prices, the primary sector accounts for 42% of the provincial GDP-R, but in nominal prices its share is significantly higher which indicates that such an economy would be highly sensitive to fluctuations of prices on commodities, particularly those that are being mined in the area. Whilst its primary sector is vast, its manufacturing sector is small which also indicates that limited processing of the raw materials that are being mined in the area is taking place in this Municipality. Following the biggest sector in the municipality – mining – are the community services sector, transport and finance sector.

2.7 Structure of Employment

The employment structure presented largely corresponds with the structure of the economy with the tertiary sector making the largest contribution towards employment creation in all areas under analysis.

- More than two thirds of the people employed in South Africa work in the tertiary sector, in particular the community and government services sector and the trade sector. Agriculture, which accounted for 3% of the national GDP-R in 2011, on the other hand, provided 6.4% of all employment opportunities; whilst the contribution of the mining industry towards the employment in the country was smaller than its contribution towards GDP-R. Nevertheless, both of the sectors are labour-intensive and create a notable number of employment opportunities in the country, particularly in rural areas.
- Employment structure in the Northern Cape is dominated by the number of people who are working in the tertiary sector, specifically in the trade, community and government services. Its secondary sector creates 9.0% of jobs in the Province, whilst its primary sector creates 24.8%.
- Most of the people employed in the Siyanda DM are working in the tertiary sector too, specifically in the community and government services, trade and finance sector. Its secondary sector creates 10.1% of jobs, whilst its primary sector creates 36.9%.
- The employment composition in the Tsantsabane LM is quite similar to that of the Northern Cape with the sectors providing the largest numbers of jobs being the community and government services, mining and quarrying, trade, and finance sectors. The mining sector, which contributes 53.6% to the GDP-R (in nominal prices), provides only 18.2% of employment opportunities in the area. At the same time, the trade, community and government sector's employment contribution is greater than its contribution towards GDP-R.

Figure 2-4 illustrates the structure of South Africa, Northern Cape, the Siyanda DM and the Tsantsabane LM economies from an employment perspective.

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Figure 2-4: Employment structure (2011)
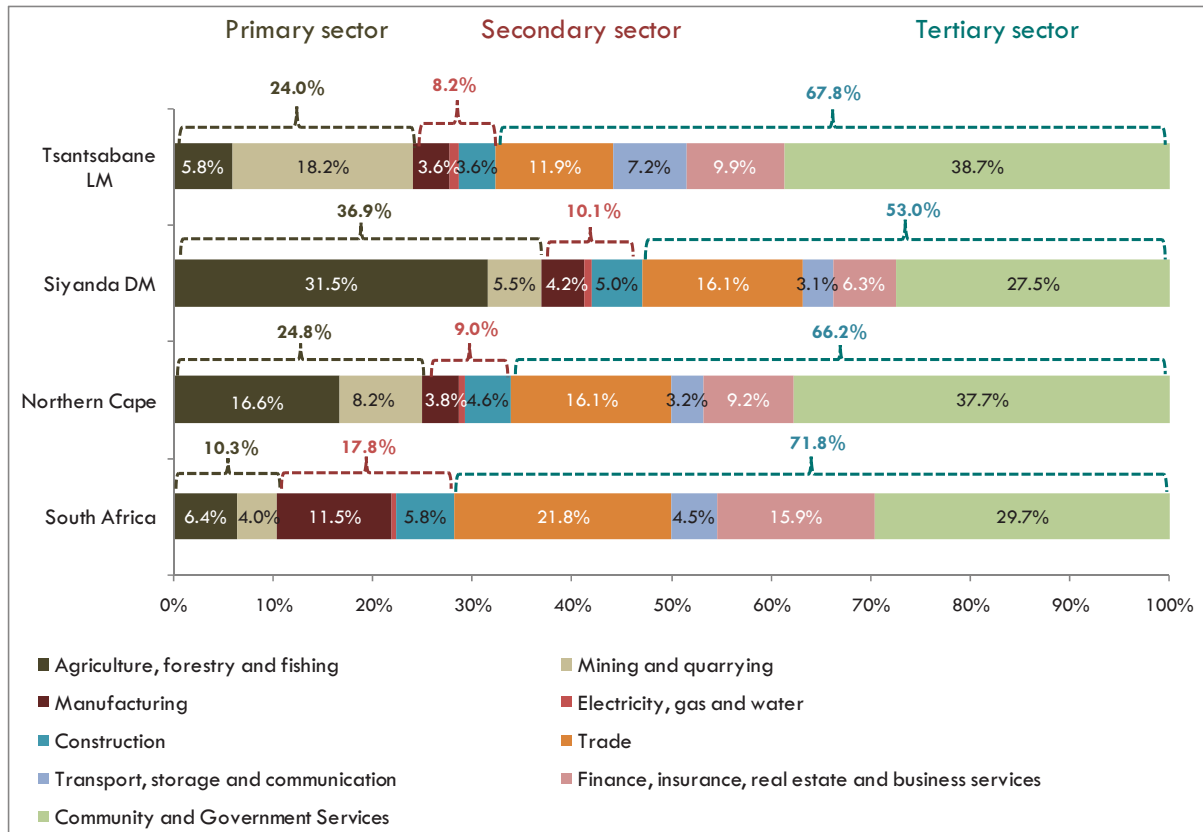
Source: Urban-Econ calculations based on Quantec, 2011

2.8   Basic service delivery and access to tenure

Access to basic service delivery and shelter are the indicators that allow understanding the standard of living of the households residing in the study areas. Comprehension of the extent to which households in the area have access to water, sanitation and electricity assists in understanding of the communities' plight and their needs. At the same time, knowledge of the types of dwellings that households reside in is valuable in developing a complete profile of the circumstances in which communities are living. All of above creates a baseline against which the potential impacts of the proposed activity could be assessed.

Table 2-7 provides information on the types of dwellings in which households live in the study areas. It indicates that 73% of households in the primary study area were living in formal dwellings and this figure also means that access to formal dwellings in the primary study area was the lowest amongst all study areas analysed. The Tsantsabane LM also had the highest percentage of households living in informal dwellings, such as a shack in a backyard of a formal dwelling or in an informal settlement. This suggests that local communities do require formal housing, for example, the Tsantsabane LM where one out of four households is living in an informal dwelling and that any project that would potentially increase the influx of people into the area could portray up growth of the housing problem, thus housing provision during construction and operation by the project should be received during the EIA phase.

Table 2-7: Dwelling types (2011)

Item	South Africa	Northern Cape	Siyanda DM	Tsantsabane LM
Formal dwelling	80.3%	83.2%	79.0%	73.0%
Informal dwelling	14.0%	10.3%	12.8%	21.5%
Other	5.7%	6.5%	8.1%	3.5%
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table 2-8 provides information on the access of households to electricity, using energy for lighting indictor as a proxy. The information presented in this table suggests that the primary study area's households have the least access to electricity compared to the other study areas. Only 78% of households in the Tsantsabane LM use electricity for lighting compared to 84.2% in the Siyanda DM and 85.8% in the Northern Cape. This information correlates with the situation of access to formal dwellings, as a smaller access to formal residence would suggest a smaller access to electricity.

Table 2-8: Energy for lighting (2011)

Item	South Africa	Northern Cape	Siyanda DM	Tsantsabane LM
Electricity	80.8%	85.8%	84.2%	78.3%
Other	19.2%	14.2%	15.8%	21.7%
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table 2-9 shows households' access to water. The situation in this case is quite different to that observed with regard to access to electricity and formal dwellings. Almost 75% of households in the primary study area as well as in the Northern Cape itself have access to water inside their dwellings. This is considerably higher than the 64.3% of households living in South Africa who have access to water inside their dwellings. At the same time, more than 78% of households in the Siyanda DM have access to water from inside their yard. This is not indicative to the rural nature of these regions, where due to the settlement pattern water is quite often provided to the neighbourhood rather than to the dwelling itself. Nevertheless, 4.9% of households in the primary study area and 5.6% of households in the Siyanda DM still have to rely on other sources of water which are not very reliable, such as water vendor, rain water, etc.

Table 2-9: Access to water (2011)

Item	South Africa	Northern Cape	Siyanda LM	Tsantsabane DM
Water inside dwelling or a yard	64.3%	75.0%	78.9%	74.4%
Water from point outside the yard	24.9%	20.0%	15.5%	18.7%
Other water access points	10.9%	5.0%	5.6%	4.9%
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table 2-10 provides information on access by households to sanitation. It indicates that 75.9% of households in the primary study area have a toilet, which is significantly higher than the 57.7% reported for South Africa. This is also a higher figure than that reported for the Siyanda DM and is also significantly higher than the percentage calculated for the Northern Cape at 72.2% and 67.6% respectively. This again is not indicative to the rural nature of these regions, where households who have access to toilets largely have access to pit toilets. This access to a chemical or flush toilet emphasises their access to water inside dwellings.

Table 2-10: Access to sanitation (2011)

Item	South Africa	Northern Cape	Siyanda DM	Tsantsabane LM
Chemical or Flush Toilet	57.7%	67.6%	72.2%	75.9%
Pit Toilet	25.8%	13.9%	9.5%	2.7%
Bucket system	2.7%	5.2%	6.1%	7.6%
Other	13.8%	13.3%	12.2%	13.9%
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Urban-Econ's calculations based on Quantec, 2011

3. SUMMARY AND POTENTIAL SOCIO-ECONOMIC IMPACTS

The proposed Humansrus CSP facility is to be located in the Tsantsabane LM about 30 kilometres southeast from Postmasburg in the Northern Cape. The Tsantsabane LM comprises of 29 150 people and 7 485 households, thus representing 2.6% of the provincial population. Over the last decade, the size of the municipality from a population perspective has been growing at a slightly quicker rate than that observed in the DM and the rest of the Province. Moreover unlike the trend observed in the province and the rest of the country, its population growth has been increasing and not declining.

Households residing in the Tsantsabane LM have relatively the same level of income as the average household in the Siyanda DM, but it is significantly lower than the average household income in the Northern Cape and even more so in South Africa. A considerably higher percentage of households in the Tsantsabane LM have no income compared to that of the other study areas. This is representative of the fact that the unemployment rate in the LM is worse than the unemployment rate in the Province and country. All of the above suggests that households residing in the Tsantsabane LM have on average lower access to employment opportunities than households in the rest of South Africa.

Households living in the primary study area have poorer access to formal dwellings and electricity that households in the rest of the province and the country. The situation with respect to the access to water and sanitation, however, is different. Compared to the percentage of households with access to water and sanitation in South Africa and in the province, a greater share of households in the Tsantsabane LM has access to water and sanitation services in their dwellings or in a yard.

The labour market in the primary study area comprised of 6 851 employed and 4 044 unemployed people in 2009. It had a bigger labour participation rate (58.2%) than in the secondary and tertiary study areas. This could be explained by the fact that a significant number of working age population in the LM remain active in the labour market, whilst the other areas have a considerable number of people who became discourage job seekers, i.e. people who are not considered to be economically active and are not included in the calculation of the unemployment rate. The fact that a significant number of people remain to be economically active in the municipality compared to their counterparts in the rest of the province could partially explain the large unemployment rate in Tsantsabane, which stands at about 37.5%. The high unemployment rate, though also shows that the local economy is not able to provide employment opportunities for a significant number of local residents, which means that any investment in the local economy that would create new sustainable jobs would be welcome.

The economy of the Municipality is relatively small (R2 billion of GDP-R) and is highly dependent on the mining sector. Since 1996 its average performance was slightly lower than in other study areas under analysis, particularly the Siyanda DM. The dependency of the local economy on the production of the mining sector makes it extremely sensitive to fluctuations of commodity prices and domestic demand for mineral, which in turn is related to the overall performance of the economy. The global recession in 2009 had exactly such an effect on the economy, when the value added of the mining sector dropped by 19%. The above emphasises the need to diversify the local economy by growing

sectors that would be less sensitive to local and global economic changes and that would offer sustainable employment opportunities in other but the mining industry.

From the employment perspective, the sectors that create the majority of jobs in the Municipality are services sectors, such as community and government services, with the mining sector following closely. Given the employment creation targets set by government in its New Growth Path and assuming that it is matched by investment, the economy of the Tsantsabane LM needs to grow at a higher rate in the future than it did in the past few years. In order to achieve these trends, though, a significant investment in the local sectors will need to be made by both private and public sectors. This means that any new development proposed for the area would most likely have a significant positive effect on the structure of the local economy (except if it is mining) and on the ability of the local economy to align itself with the new socio-economic path set up by government.

In light of the socio-economic situation in the primary study area and given the knowledge of the proposed activity, it is expected that the proposed activity, i.e. energy generation using renewable sources, will have a positive impact on the local economy by increasing the local utilities sector and creating new employment opportunities. It will also contribute to the achievement of a number of government objectives related to job creation, diversifying electricity generation capacity in the country, and combating climate change. Moreover, it could potentially stimulate further development of local industries that could become involved in manufacturing components for and maintenance of similar facilities. Through indirect and induced effects it is also expected to have a positive impact on the production volumes of supporting industries and sectors that service consumers. Although if the majority of investment will be spent on purchasing foreign equipment and machinery, the positive impact of the project could be significantly lower than the potential impact.

The establishment of a CSP Plant could result in the discontinuation of the current agricultural activities on the farm and could have a negative impact on the farms surrounding it. The actual extent of this effect will still need to be determined. Most importantly, though, the net effect of the project will need to be estimated during the socio-economic impact assessment. This refers to the comparison of the socio-economic impacts of the proposed activity with the socio-economic effects of the current activity on site.

From a social perspective, creation of new employment opportunities will most likely have a positive impact on the standard of living of the affected households. The project though could also create a number of negative socio-economic effects, particularly during construction. These include potential increase of crime in the area, increase of health concerns and potential deterioration of health due to noise and dust in the area.

Overall, the potential socio-economic impacts that could be predicted at this stage and that will need to be investigated in the specialist study include:

- Strategic macro-economic impacts:
    - Assistance in achieving government objectives;
    - Impact on balance of payment due to possibility that certain equipment and machinery will be imported;
    - Provision of electricity without putting additional pressure on water resources;
    - Reduced emissions and potential to trade in carbon credits, and
    - Potential to establish a new manufacturing industry.
- During the construction phase:
    - Temporary increase in production and GDP-R in industries supporting the construction;
    - Temporary employment creation at the construction site and supporting industries;

- o Temporary increase in government revenue due to the establishment of the plant;
  - o Permanent loss of production created by the current agricultural activities;
  - o Permanent loss of jobs associated with the existing agricultural activities on site;
  - o Influx of job seekers and associated crime concerns;
  - o Possible negative health impacts associated with migrants, and
  - o Temporary increase in households' income levels.
- During the operational phase:
  - o Increase in production and GDP-R due to the plant's operations;
  - o Creation of sustainable employment opportunities at the plant and supporting industries;
  - o Increase in government revenue;
  - o Skills development;
  - o Improvement of living standards of positively affected households (thought employment);
  - o Increase in households' income levels;
  - o Change in standards of living of the directly affected households, and
  - o Impact on local tourism.