A Gender Impact Analysis of Kusile and Medupi Investment on Employment by Economic Sectors in South Africa: Application of Social Accounting Matrix

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Abstract

Gender equality has for many decades been at top of both local and international developmental agenda. Very few economists have recently started to appreciate "gender equality and women empowerment" as intrinsic part to development, if in any way a state need to achieve sustainable development. While on the other hand, infrastructure development is a pre-requisite for economic growth and development; gender equality has been neglected as an integral part of infrastructure planning, implementation, operationalisation and maintenance. It is evident from the findings that electricity industry is male dominated hence the females job opportunities remains lower than that of males in this industry. Across all economic sectors, more males will benefit in terms of employment compared to females which reflect extent the of gender inequality in South African Labour Market.

Keywords: Gender, GDP, Employment, Social Accounting Matrix.

1. Introduction

Internationally and historically, women have found themselves subject to different forms of discriminatory behavior, attitudes and policies, whether intended or unintended, which have hampered their full integration into the employment market. South Africa is no exception and, hence, various policies and campaigns have been implemented to ensure equal and just access to the labour market for women, (Department of Labour, 2006). Various studies have overtime showed the relationship between women and poverty and poor state of both social and economic infrastructures which hampers the development of women.

Energy security remains key attracting investment, enhancing both economic and human development. South Africa has for the past-years resolved to invest in electricity infrastructure with the sole intention of ensuring future energy security for the country. However, the economic impact of such investment must be carefully investigated especially the gender dynamics thereof. According to Kehler (2007), women's realities in South Africa are still determined by race, class, and gender-based access to resources and opportunities. This further suggests that race, class and gender are the determinants for prevailing political, social and economic inequalities. Thus, poor black women's access to resources, opportunities and education, as well as their access to growth and wealth of the country is severely limited. Black rural women are the ones faced with an even greater lack of access to resources and prosperity and therefore live under immense poverty (Kehler, 2007).

Various conditions and systems in different societies have in many ways prevented women to participate if not fully in the labour market. In most African countries including South Africa, women have for a long time engaged in unpaid work such as collection of wood for heating and cooking, collection water, cooking and amongst others child rearing and laundry in their respective households. These traditional practices have therefore impeded women in acquiring education and skills that would enable them to fully participate in the formal paying economies. As a result, women still remain under-represented in the labour market in South Africa and across Africa.

Women empowerment and gender equality remains vital for sustainable development. Although there is a slight increase in the participation of women in economic decision-making and development projects; women are largely absent at all levels of policy formulation and decision-making in infrastructure development sector and other key economic sectors. According to study by Commission for Gender Equality (CGE), South African Gender Barometer Project (2009), there are several challenges with regard to economic empowerment of women, some challenges are, women's negligible benefit from Black Economic Empowerment (BEE) policies and transactions; inadequate financing for women's business; Marginalisation of rural women and finally, poor levels of business growth, and penetration of economic mainstream.

How does infrastructure investment in the electricity industry affect the South African economy and more specifically what are the gender dimensions on employment, income and welfare of men and women? According to Mosenogi (2014) since the adoption of Reconstruction and Development Programme (RDP) and Growth, Employment and Redistribution Policy (GEAR); infrastructure has always been at the centre of development. Furthermore, an increase in Infrastructure investment has been one of the Accelerated Shared Growth Initiative for South Africa (ASGISA) primary priority areas which are to attain economic growth and reduce unemployment and poverty by 2015. The National Development Plan (NDP) has also continued to emphasise and the need to accelerate infrastructure development for a country to achieve economic growth and development. Amongst others, South Africa has recently invested R118.5 billion excluding interest during construction, cost of cover and inflation in Kusile Power Station Project which is expected to generate 4 800 MW (Eskom, 2015). The second project is Medupi Power Station Project where Government has invested approximately R105 billion and is expected to generate 4 800 MW (Engineering News, Projects in Progress, March 2015).

While many researchers have proved that infrastructure investment in general has a positive impact on economic growth, very few studies have been carried out to assess the impact of infrastructure investment from a gender perspective. Women constitute 52% of the total population in South Africa. According to Kinyondo (2007), many women are still held back by cultural traditional practices and different belief systems of the society which favours men over women. Noting the status of women in South Africa and the fact that women have been the most disadvantaged group of the society in fields of employment, education, health, income and well-being, the

impact could be dynamic and thus need to be thoroughly assessed.
As argued by Kinyondo (2007), in non-farm endeavours, women find it difficult to take advantage of new employment opportunities that involves advanced technological skills. This is based on low skills levels possessed by most women. Thus, the study aims to assess the gender dimension of labour within electricity infrastructure development in South Africa, while considering the spill-over effects into other economic sectors

2. Literature Review

According to OECD (2019) good access to quality and sustainable infrastructure is a critical determinant of people's well-being and a basic requirement for businesses to succeed. High-quality infrastructure from digital, transport, energy and water to public parks and museums underpins inclusive growth and supports sustainable development, congruent to the 2030 Agenda (OECD, 2019). Infrastructure is fundamental to propel equality in economic opportunities, to integrate left-behind regions, ensuring easy access to public services for citizens and, in general, to improve life quality, (OECD, 2019). In developing infrastructure, the needs of both men and women must be considered.
As argued by The World Bank, (2010), infrastructure should not only be developed for women but also by women. A number of infrastructure projects provide opportunities for open engagement with both local women and men, undertake analysis of how gender-based differences in norms, roles, and responsibilities may shape project implementation and benefits, and bring on board actions in the design to address gender-based disparities, (The World Bank, 2010). According to the "OECD Development Assistance Committee", truly integrating gender into infrastructure development project needs a shift in mind-sets from seeing gender as "requiring attention" to viewing women and girls as the "primary clients whose satisfaction is a critical factor in ensuring the project's success and sustainability. When gender equality issues are not considered, women can become worse off—both absolutely and in relation to men" (OECD n.d., 3).
Aguilar and Hart (2018) argues that the significance of gender in energy infrastructure points out that, the differentiated impacts of these developments on women and men are seldom explored, discussed or documented. There is indication that the impacts differ because of the direct effect on women and men, e.g. through job opportunities, as well as through indirect impacts, e.g. with respect to access to land and resources. Regarding jobs, men typically benefit more from large-scale energy infrastructure, as they are often employed as construction Labor. Women, meanwhile, often engage in more informal, lower paying, traditional jobs, such as catering, laundry and clerical work.
It is important to note that infrastructure development does not only presents social and economic opportunities. Such projects can also pose different social and economic challenges to both men and women during and post construction phase. the extraction and construction processes of energy infrastructure implies the arrival of construction brigades, mainly a temporary workforce composed of men. This

influx of transient workforces can have an impact on the social relations of nearby communities, potentially including increased incidences of unwanted pregnancies, gender-based violence (GBV), prostitution and trafficking, and sexually transmitted diseases, including HIV/AIDS, (Aguilar and Hart, 2018). As argued by OECD (2019), it is often assumed that women will automatically benefit from new infrastructure projects in the same way as men do, without acknowledging possible distinct impacts on women and men according to their needs and social roles. The importance of gender-sensitive impact assessment cannot be over-emphasised. Prior to the commencement of every infrastructure project, the impact on both men and women at economic and social level must be under-taken so all necessary measures can but designed to mitigated risks or challenges that both genders might be exposed to.

Gender mainstreaming, gendered budgeting, and women's empowerment figure prominently in economic and social policies at varying scale; in international institutions such as the United Nations, the World Bank, and the EU; as well as in national, regional, and local institutions, (Perrons, 2005). Recent studies have highlighted how institutional barriers have impeded gender mainstreaming and have suggested that it is unrealistic to expect social transformation to be attained through public policy alone (Perrons, 2005; Standing, 2004, and Subramanian, 2004). Mukhopadhyay (2004) suggests that gender mainstreaming has become normalised as a "technical project" and has been divorced from its feminist political root, which challenge imbalanced power relations.

According to African Development Bank Group (2009), in reality infrastructure projects are often gender insensitive due to the assumption that women and men will naturally benefit equally from new infrastructure development, without due acknowledgement of the full scale of social and economic impacts, whether positive or negative. In order to achieve the desired developmental outcomes and impact, a conscious decision to mainstream gender in development projects must be mad. As argued by Fofack (2011), empirical evidence is increasingly showing that projects which integrate gender considerations have higher chances of meeting their underlying development objectives. The African Development Bank Group (2009), advance the following gender infrastructure indicators for infrastructure project cycle to ensure intentional equitable benefit for women in infrastructure development projects as Kusile and Medupi power plant in South Africa.

As argued by Kohlin et al (2011), energy interventions can have significant gender benefits which can be realized via careful design and targeting of interventions based on a context-specific understanding of energy scarcity and household decision-making. However, Regional infrastructure plans are intended to facilitate growth and economic integration; however, they face serious challenges. Many suffer from design flaws, reflecting outdated industrial models that connect extractive industries to power sources via thermal or hydropower plants and transmission lines, and to port facilities via roads, railways, and pipelines, (United Nations Human Rights, 2017).

Mainstreaming gender in all forms of infrastructure development including that of energy is of critical importance for sustainable development. According to Cecelski (2004), increasing women's access to credit, land and employment through affirmative action, it was argued, would make programmes more effective and better able to meet their goals of growth and productivity. Thus both "equity" and "efficiency" rationales were used to justify intervention in favour of women. Later, the gender and development approach, rather than focusing on women in isolation, argued that it is important to understand the distinct culturally and socially defined roles and tasks that women and men assume both within the family and in the community, (Cecelski, 2004).

- Gender integration in the energy sector is gaining traction globally, (Aguilar and Hart, 2018). Energy poverty on the continent (Africa) is gendered; there are different gender-defined roles in energy production, distribution and use in households, communities and the market. Therefore, women and men experience energy poverty differently. Women and girls are forced to travel long distances to collect fuelwood or water and to carry heavy loads, (Ngum, 2016). According to African Development Bank Group (2009), four of the key energy issues for poor rural women that demand the attention of rural electrification programs include the following:
- "Data needs and analysis. Disaggregating energy use, supply, and impacts by gender to provide a better basis for applying incorporating gender in project design and implementation, as well as at the micro- and macro-policy levels".
- "Wood energy, cooking, and health. Seeking integrated approaches and various solutions (including fossil fuels and perhaps electric cooking) that recognize the importance of wood energy and cooking for poor women and its health implications".
- "Women's specific electricity needs. Addressing water pumping, agricultural processing, security, work productivity, and health in the framework of sectoral development initiatives".
- "Equal access to credit, extension, training. Assuring energy and electricity supplies for women's domestic tasks as well as their micro-enterprise activities.
- Identifying the most critical energy needs of the majority, but also the priorities for women and men";
- "Determine whether communities are to be displaced, will the compensation package consider men's and women's gender-based roles and responsibilities";
- "Assess whether mitigation measures include specific actions to address women's needs such as continued ability to source food from the natural environment. Review whether the displacement package aimed at "restoring" livelihoods has considered the gendered nature of the household economy".
- "Assess whether the cost has been factored into the outcomes of the project so that women from poorer households might benefit".

According to Aguilar and Hart, (2018), a gender-responsive approach to project design and implementation enables the identification of potential barriers to enable energy access to vulnerable households and provides a better understanding of the needs and interests of the whole population of target communities. When integrating women's empowerment and gender equality strategies, large-scale renewable energy projects have an opportunity to deliver better and more impactful development outcomes (Aguilar and Hart, 2018).

There are significant benefits in electricity infrastructure development for both women and men. Backward and forward linkages in the Social Accounting Matrix is more capable to illustrate these. According to Habtezion (2013), policies that include both women and men during development stages will support equitable benefits from the setting up, maintenance, sale of and access to energy services. Infrastructure projects designed to promote cleaner, more efficient forms of fossil fuels and renewable energy can offer new skills training and increased employment for women. Therefore, more efforts are needed to involve women in the design, maintenance and dissemination of locally appropriate energy technologies and services (Habtezion, 2013).

Evidently, most countries are making moves to mainstream gender in development project including energy projects. According to Cecelski (2004), a number of energy programmes in both North and South are starting to pay closer attention to gender and have launched important initiatives. Energy interventions are generally seen as potentially beneficial to both women and men in a number of ways, and there are now some specific experiences and documentation of some projects that have effectively involved both women and men as staff and entrepreneurs as well as beneficiaries. Labour market remains very dynamic in the current economic environment which is highly technology drive and globalised in nature. Various economic developments globally affect South African labour market in different ways. As argued by Skinner (2002), Labour economics distinguishes between functional and numerical labour market flexibility.

Washbrook's (2000), pioneering work on the gender division of labour suggests that economic theory suggests that the price an individual can command in the labour market for an hour of their time plays a key role in determining the way in which they allocate their time between different uses. Washbrook's (2000), further argues that this is the case in models of individual utility maximization, in which the wage determines the optimal degree of substitution between purchased goods and services and domestically-produced output, and also in models that emphasise the gains to intra-household specialization and trade. However, it is not clear to what extent in practice gender wage differences explain the observed gender division of labour. The importance of social norms regarding gender stereotypes and innate biological differences in the capabilities of men and women may swamp the role of gender wage differences in the allocation of time (Washbrook, 2007).

3. Data and Methodology

3.1 Data Source

The SAM represents a static image of the social and economic structure of a country in a specific year, presented in the form of double entry bookkeeping (Mosenogi, 2014). The SAM comprises series of accounts in which income and expenditure must balance. Each account consists of a row responsible for recording the details of receipts and a corresponding column that records expenditure in the form of a square matrix, (Kinyondo, 2007). SAM is therefore a clear picture of all transactions taking place within the economy and the impacts of such transaction on one another can be easily accessed through SAM (Mosenogi, 2014).

A SAM elaborates on the linkages between SU-Tables and institutional sector accounts. According to Conningarth Economist (2007), the development of the SAM is very significant as it provides a framework within the context of System of National Accounts (SNA) in which the activities of all economic agents are accentuated and prominently distinguishes. As argued by Mosenogi (2014) by combining these;

- Firstly, a SAM gives a frame work for organizing information about the economic and social structure of a particular geographical entity (i.e. a country, region or province) for a particular time period (usually one calendar year), and
- Secondly, to provide a database that can be used by any one of a number of different macroeconomic modelling tools for evaluating the impact of different economic decisions and/or economic development programmes.

According to Mosenogi (2014) the data requirements for all economic models can always be expressed in the form of SAM. If it is not possible to express the data in this particular manner, the model will invariably be flawed, making its application in the model-building arena impossible. It is this particular characteristic of the SAM that has made it popular as the database of preference for multi-sector economic models that are used to assess the economic implications of policy changes (or shocks) that will have effects not only on macroeconomic aggregates such as GDP, job opportunities, the balance of payments, etc., but also upon the structure of the economy. As such, these models must have access to information about production, consumption, labour markets, and the functional of income and the composition of trade (Mosenogi, 2014).

A defining feature of multi-sector macroeconomic models is their recognition of the extent to which economic system are characterized by interdependency, in terms of which economic events that impact one sector will have repercussions that are experienced, to a greater or lesser extent, throughout the economy (Mosenogi, 2014). As such, these models can be used to quantity the magnitude of these repercussions, and to assess the efficacy of alternative economic policies and development initiatives.

3.2 Methodology

The study mainly applies a Social Accounting Matrix (SAM) based on statistics South Africa and correctly adjusted to perform the required analysis on the basis of gender. According to Fathurrahman (2014), the SAM analysis is mainly an impact analysis usually used to describe the impact of a given policy on the economy. A SAM coupled with a conceptual framework that contains the behavioural and technical relationships among variables within and among sets of accounts can be used for the evaluation of the economy-wide effects of policy changes or other economic impacts rather than only for purely diagnostic purposes (Mosenogi, 2014; van Wyk, Saayman, Roussouw and Saayman, 2014; Pyatt, 1988).

Step one is primarily choosing the exogenous accounts. The rest of the world account, the government account, and the investment account follows and are included in the exogenous matrix of the multiplier model. In choosing to compute the direct and indirect effects only, the household account must also be included in the exogenous matrix. The next step in producing SAM multipliers is to calculate the direct requirements matrix (A). The values of the cells in the direct requirements matrix are derived by dividing each cell in a column by its column total. Each cell in a column

of the direct requirements matrix "A" shows how many cents of each producing industry's goods or services are required to produce one Rand of the consuming industry's production.
In the process of producing the multipliers, the Leontief Inverse is calculated. "A basic SAM model can be written as:

$$X - AX = Y, \qquad (1)$$

where X is the column vector of gross industrial output, Y is the column vector of exogenous final demand accounts, and A is the direct requirement matrix.
We can express this equation as:

$$(I - A)X = Y \qquad (2)$$

or

$$X = (I – A)-1\ Y \qquad (3)$$

$$X = BY, \qquad (4)$$

where
I is the identity matrix (with "1" in the diagonal, "0" in all other fields), (I-A)-1 is the "Leontief Inverse (Matrix)" = B (or B' if induced effects are included), B (or B') is the matrix of direct and indirect (and induced) coefficients bij (or b'ij), and bij (or b'ij) = "Leontief Coefficient" representing the direct and indirect (and "induced") requirements per unit of final demand for the output of sector j".
The crux of the model is dynamic therefore it is best suited for the short-run and long-run effect analysis as it includes inter-period capital adjustments through investment mechanisms or labour supply adjustments via e.g. gender. However, some properties of the SAM model, such as, the long-run factors adjustment; can be incorporated in an ad hoc approach, the amount of labour included in production may differ with endogenous unemployment levels and total capital supply, although fixed in the basic model specification, could be made endogenously demand-driven. The model callibrates another long-run property, that is labour, and capital are mobile across sectors.
As argued by Kinyondo (2007), the gendered model has different assumptions concerning the factor closure.
(a) The initial assumption considers the state of labour in the South African economy. Capital is assumed fully employed and sectorally fixed. Skilled men and women labour is fully employed and mobile across sectors the situation that mirrors rapid job turnover in the South African economy. Although capital is highly mobile (Seguino, 2000b; Kinyondo, 2007), as a result of challenges associated with changing capital stock in the short-run, capital is pre-supposed to be sectorally fixed. The equilibrating variable is the "wage rate" in the instance of labour while for capital its sector-specific returns adjusts in order to maintain the employment level in the sector. On the other hand, unskilled and semi-skilled men and women labour is modelled as mobile across sectors, but unemployed (elastic supply). This implies that there is fixed average wage across activities in the economy (Kinyondo, 2007).
(b) as a consequence of South Africa's dominant labour movements, it is assumed that all workers face flexible wages in a market that is characteristic of full employment. thus, the assumption involves a given supply of fully employed and full mobile

capital and men and women of different skills. The labour wages and capital returns move in sectors to equilibrate the labour market (Kinyondo, 2007).
It is therefore assumed that all workers in the economy receive equal average wage *PL* (PL_M *and* PL_F). This, rather strong assumption could be relaxed by factoring the sectoral distortion parameters given the availability of data on the number of workers in each sector (Robinson *et al.*, 1999, Kinyondo, 2007). Although total labour supply LS (LS_M and LS_F) is fixed, the amount available for production could vary as workers move in and out of unemployment Unemp ($Uemp_M$ and $Uemp_F$) according to the theory underpinning Phillips curve type of relationship.

$$\frac{\omega^1-\omega^0}{\omega^0}=\rho\frac{u^1-u^0}{u^0} \qquad (5)$$

"Where"
u_M **=** $\mathbf{Unemp_M/LS_M}$**;** $\omega_M = PL_M/CPI$
u_F **=** $\mathbf{Unemp_F/LS_F}$**;** $\omega_F = PL_F/CPI$

The superscript 0 represent the benchmark equilibrium whereas 1 represent value after some change; *CPI* stands for consumer price index and ϱ denotes the Phillips parameter, which has to be obtained from other sources. Assumption in (5) along with fixed nominal wage (will be dealt with latter) implies that unemployment clears the market and hence defines the labour market to be demand driven.

Employment Effects "Coefficient"
SAM framework is basically using monetary values in its transactions matrix. However, as already discussed in the previous sub-chapter, employment changes will be analysed for the study. In order to do that, the monetary value should be converted into employment value (physical terms) by using an employment coefficient. As argued by International Finance Corporation (2015), the employment effects can be estimated in the following steps:

- Compute the employment coefficient per industry. For example, for industry i: Employment coefficient i = number of employees in industry i / output of industry I (measured in monetary units).
- Compute the change (using the output multiplier) in the output of the industry i due to a shock to the final demand of an industry j.
- Multiply the change in the output of industry i by the employment coefficient of industry i. This will give the change in the number of jobs in industry i as a result of a shock in the final demand of industry j.
- Total number of new jobs in the economy as a result of a shock to the final demand of industry j = $\sum_i$ *change in employment in industry i*

Thus, computing employment is done as follows:
As Argued by Fathurrahman (2014), to do this, let's assume "e" as an employment coefficient which is described as total manpower needed per billion IDR of sectoral output. In mathematical form it can be written as follows:

e_j = Employment$_j$/Y_j (6)
Where:
Y_j = Total output of sector in row j
Employmentj = Total employment for sector in row-j
e_j= employment coefficient for sector in row-j

The employment coefficient used in the study can be seen in Table 13. Here, we assume those employment coefficients will remain constant regardless of changes in sectoral output. The employment impact (changes) then can be assessed by multiplying employment coefficient by each sector's output changes:

$\Delta\varepsilon_j = \Delta Y_j e_j$ (7)

Where:
$\Delta\varepsilon_j$ = Employment impact (changes) for sector in row-j (8)
ΔY_j = Output changes for sector in row-j (9)

In operationalising the model, the returns of the business economy related with the electricity infrastructure investment are considered to be "outside agents" impacting on the model through an increase in its final demand components. The implication of this is that for every project a (column) vector for every relevant final demand component of the model, on a commodity basis, had to be compiled. Each of these final demand components had to be disaggregated on a detailed basis, such as turnover and intermediate demand on labour by gender basis, salaries and wages, gross operating surplus (GOS), number of workers per skill level, portion of goods and services to be exported, etc. The model structure is based on the Standard Industrial Classification (SIC) of sectors (International Finance Corporation, 2015).

4. Study Results

Table 1 below illustrates the effect of Eskom's capital investment programme on both Medupi and Kusile on the nine main sectors of the South African economy in terms of GDP and job creation. It is important to note that the ripple effect of this investment programme will be realised across a wide spectrum of sectors and not only in those that are directly involved with the two power stations.

Table 1: Sectoral Combined GDP and Employment Impact of Eskom's R223.5 – Billion Capital Investment Programme on Medupi and Kusile Power Stations

Sector name	**GDP (R Million)**	**Percentage**	**Employment (Numbers)**	**Percentage**
1.Agriculture	R 1,445.2	1.2%	31,134	5.8%
2.Mining	R 3,768.7	3.2%	10,183	1.9%
3.Manufacturing	R 10,607.6	9.1%	52,883	9.9%
4.Electricity & water	R 43,937.4	37.8%	113,639	21.3%

5.Construction	R 4,597.5	4.0%	55,219	10.3%
6.Trade & accommodation	R 9,342.5	8.0%	105,508	19.7%
7.Transport & communication	R 5,365.2	4.6%	17,978	3.4%
8.Financial & business services	R 24,771.1	21.3%	79,019	14.8%
9.Community services	R 12,467.0	10.7%	68,739	12.9%
Total	**R 116,302.1**	**100%**	**534,302**	**100.0%**

Source: Author's Own Computation Results

Table 1 above indicates that the major impacts of the R223.5 billion capital investment programmes of both Medupi and Kusile power stations in terms of GDP, will primarily be experienced in the Electricity and water Sector (37.8%), Financial & Business Services Sector (21.3%), Community Services (10.7%) and Manufacturing (9.1%). As far as employment is concerned, a significant concentration is particularly marked in the case of job creation numbers, where almost 21.3% of jobs are created in the Electricity and Water sector, 19.7% in the trade and accommodation sector, 14.8% in the Financial and Business services sector, 12.9% in the Community services sector and 10.3% in the Construction sector.

As shown in table 1 above, lowest GDP beneficiaries in terms of economic sectors in electricity infrastructure investment are Agriculture at 1.2% followed by Mining at 3.2% and Construction at 4%. Fewer jobs will be created in Mining (1.9%), followed by Transport & Communications (3.4%) and the third lowest performer being Agriculture at 5.8%. Table 2 below shows economic sector employment impact results disaggregated by gender and skills level.

Table 2: Sectoral Combined Employment Impact of Eskom's R223.5 – Billion Capital Investment Programme on Medupi and Kusile Power Stations

	Skilled		**Semi - Skilled**		**Unskilled**		**Total Impact**
Economic Sectors	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	
1.Agriculture	407	887	1645	2391	10357	15447	31 134
2.Mining	132	1074	933	2423	2604	3017	10 183
3.Manufacturing	3107	6405	9482	10426	12079	11384	52 883
4.Electricity & water	8396	24524	18767	25061	15993	20899	113 639
5.Construction	724	5067	11729	21877	6088	9733	55 219
6.Trade & accommodation	6720	7455	29011	28608	17862	15853	105 508
7.Transport & communication	874	3566	1228	2672	3662	5977	17 978
8.Financial & business services	12271	17564	12564	23977	5894	6749	79 019

9. Community services	13282	8419	11056	8010	15159	12812	68 739
Total	**45912**	**74961**	**96416**	**125444**	**89698**	**101872**	**53 4302**

Source: Author's Own Computation Results

Table 2 above shows the national employment impact by gender and skills level as a result of investment in electricity infrastructure in South Africa across nine economic sectors. The study results show that for the skilled, semi-skilled and unskilled females more jobs will be created in Community Services (13 282) with Trade and Accommodation (29 011) and (17 862), respectively. Across all skill levels, males are the leading beneficiaries in the Electricity and Water sector.

For both females and males, fewer jobs will be created in Agriculture sector for the skills laborers while fewer jobs for both semi-skilled and unskilled laborers are created in the mining sector. Evidently, mining sector (10 183) will create fewer total employment opportunities while Electricity and Water sector (113 639) across the South African economy. In terms of skills levels, more of semi-skilled females and males will benefit from the said investment while fewer skilled females and males stand to benefit from created employment opportunities.

5. Conclusion

The purpose of this study is to analyse the impact of electricity infrastructure investment on gender labour dynamics in South Africa and the SAM model outlined above is relevant to bring forth such impact analysis. As argued by Mosenogi (2014), The clearly make the organisation and analysis of data more accurate and has the capability to go beyond two explanatory variables under study by showing direct, indirect and induced impact. While SAM modelling remains complex, incorporating gender analysis in the SAM model makes it more complicated due to first, the limited gendered social accounting matric and secondly, the technical process of developing and incorporating satellite account into the SAM model. The model outlined above provide a clear equation for the study and shall produce reliable results for sound policy decision making.

The SAM based Model shows that total employment will be positively impacted and labour force with different skills level will unequally benefit. Taking into account the gender dynamics of labour and gender-based employment supported by electricity infrastructure investment, females and males does not equally benefit, with the multiplier effects still being positive for both females and males with men benefitting more in terms of employment at both construction and operational phases of Kusile and Medupi power stations.

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