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Power Generation, Employee And Societal Well-Being

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Abstract

This research was conducted to explore the employees' perceptions of clean coal technology (CCT) and the effect of CCT on the state-owned electricity supplier in South Africa (Eskom) and society. A sample of 125 employees from Eskom were surveyed using Google Forms. It was found that CCT is acceptable, appropriate and feasible for Eskom and the effects of CCT on Eskom were found to be positive, although statistically insignificant. The results further suggest that CCT has a negligible relationship with society and the environment, except for general health. The relationship between CCT and corporate governance and CCT and social responsibility was also not significant. Thus, it became apparent that the implementation of CCT will improve the general health of people who are affected by emissions from coal-fired power plants and will support the South African government's commitment to reducing carbon emissions. However, the feasibility of implementing CCT requires more comprehensive research among different stakeholders using reliable indicators of the effects of CCT on Eskom and society at large.

Keywords: alternate energy; clean energy; power generation.

1. INTRODUCTION

The South African energy sector presently faces several challenges, including meeting the need for an ever-growing energy supply, providing an uninterrupted supply of electricity and avoiding power outages (Pretorius et al., 2015). Domestic energy utilization in South Africa dramatically increased during the period 1994 to 2007, due to the application of a Free Basic Electricity Policy in 2001 (Inglesi and Pouris, 2010).

Eskom, the state-owned power company, generates approximately 85% of the electricity used in South Africa, and provides a substantial share of the electricity generated on the African continent (*South Africa - Energy*, 2020). Eskom faces huge challenges in meeting the ever-growing demand for electricity.

In January 2010, the country officially reported its climate change mitigation proposals to the United Nations Convention on Climate Change, which comprised a 34% reduction of emissions below 'Business as Usual' by 2020, and a 42% reduction by 2025 (Pretorius et al., 2015). This triggered several studies and discussions, including the study on the use of clean coal technology (CCT). The integration of clean and sustainable energy technologies in South Africa requires solutions that deal with high CO_2-emitting sources, such as coal-fired thermal power plants (Banks, & Schäffler, 2010). Hence, the research and development (R&D) of clean coal technologies for South Africa has become critical.

The South African Integrated Resource Plan (IRP) is an electricity infrastructure development plan which is part of the National Development Plan (NDP), is based on a least-cost electricity supply and demand balance, while also taking supply security and the environment into account. On October 17, 2019, the South African Minister of Mineral Resources and Energy signed the IRP and although the IRP was supposed to be renewed every two years, this has not taken place. It has become highly politicised and delayed, due to manoeuvring around the generation mix, particularly the balance between baseload such as nuclear power and coal, and renewables. (*South Africa - Energy*, 2020).

Although it can be reasonably argued that CCT could be used as an alternative to the decommissioning of power plants, the question is whether it be feasible, appropriate, and accepted by the employees. The effect of CCT on society needs to be analysed further, as Eskom needs to make ethical and socially responsible decisions.

It is against the above background that this study was conducted to explore the employees' perceptions on the use of CCT and analyse the effect of CCT on Eskom and society in general. The objectives of the research are to analyse the effects of clean coal technology on Eskom; assess the impact of clean coal technology on society and the environment and evaluate the relationship between business ethics and the implementation of CCT at Eskom.

2. LITERATURE REVIEW

Lim et al. (2013), assert that global carbon dioxide emissions have risen by approximately 2.7 per cent in the last decade, which is 60 per cent higher than in the late 20th century. According to Sekoai and Daramola (2015), South Africa (SA) is the leading Co_2 emitter in Africa and ranks among the top 12 emitters in the world. Carbon emissions will continue to rise unless the development of carbon-neutral technology accelerates or large emitting sources, such as coal-fired thermal power plants, implement Co_2 capture technologies (Sekoai & Yoro, 2016). South Africa is ranked seventh in the world for producing electricity using coal-powered power plants (Pearce, 2020).

De Villiers et al. (2009), assert that the South African economy is largely dependent on coal reserves for energy supply, and its utilisation is expected to continue for the next three decades. As the energy sector is heavily reliant on coal fuel, South Africa's coal-fired thermal power plants are the country's main Co_2 emitters. Coal-fired power plants produce more than 90% of South Africa's electricity, which is distributed through the country's state - owned company, Electricity Supply Commission (Eskom). Yoro et al. (2016) state that South Africa's power utility, Eskom is one of the world's largest CO_2-emitting companies due to its use of crushed coal combustion plants for power generation.

Since the energy generated by coal-fired power plants contributes to global greenhouse gas (GHG) emissions, it is important for the power sector to become more competitive to combat climate change. Coal-generated power is now a major source of energy around the world, and coal-generated energy is also expected to be part of the global energy mixes in the coming future (Pitso, 2019). As the world moves toward sustainable energy transformation, a substantial analysis shows that coal will not withdraw from the energy mix, however it is possible to push towards the rollout of clean coal technologies to allow for required pollution reductions.

Across the globe, concrete plans are being developed for clean coal technologies. For example, China's National Energy Administration (CNEA) has developed an 'Action Plan for Clean and Efficient Use of Coal (2015-2020)' as the concrete proposal for China's clean coal policy (China National Energy Strategy and Policy 2020 subtitle 6: Energy, Environment and Its Public Health Impact, 2013), as cited by Pitso (2019).

South Africa's National Development Plan (NDP) (2030) acknowledges the need to implement advanced clean coal technologies to reduce emissions and address the issue of climate change. It is critical to retrofit existing coal plants with CCS or other clean coal technologies (NDP, 2012). The wet flue gas desulfurization (WFGD) plant is designed to be Eskom's cleanest coal-fired power plant. During its performance testing, one of Eskom's plant's (Kusile) WFGD plant surpassed the original performance commitments and it is achieving a removal efficiency rate of 93 percent and delivering more value to Eskom and the local communities (Biznis Africa, 2018 as cited by Pitso, 2019).

Low air quality has a significant effect on low-income communities (Hersey et al., 2014). These settlements are typically characterized by high levels of poverty, inadequate service delivery, and a scarcity of resources (Language et al. 2016).

They frequently bear the double challenge of unhealthy living conditions and a vulnerability to low levels of ambient air quality caused by indoor and outdoor air emissions from different sources (John and Sonali, 2012). This is because most residents in these settlements do not earn enough to support clean energy options, so they settle for less expensive and more easily accessible alternatives, such as wood, kerosene oil, and coal (Language et al. 2016). These settlements are typically found in regions immediately affected by large pollution sources, such as coal power plants. However, public agencies and the civil society are putting increasing pressure on the sector to reduce air emissions and its carbon footprint. The shift from fossil fuels to renewables would protect the environment.

A variety of solutions to mitigate climate change are currently being discussed around the world, including carbon capture and storage technologies (CCS), which according to Yoro et al. (2016) will help to reduce carbon emissions, enabling coal-dependent electricity markets like South Africa to continue to operate. The adoption of CCS technology has been hampered primarily by financial constraints, since the cost of incorporating CCS into power systems can range from 30% to 70% - depending on the method of CO_2 capture used (Schacht & Jenkins, 2014; Beaubien et al., 2013). Economic barriers are a challenge in the sense that CCS is expensive and cannot be implemented by most developing countries. Nonetheless, South Africa is one of the rapidly developing countries with good economic frameworks and policies in place to successfully implement CCS in its coal-fired power plants. There has also been some scepticism about the deployment of CCS technology in South Africa since it has been debated that its implementation will jeopardise the country's efforts to develop renewable and sustainable energy resources, because they also necessitate significant financial incentives from the government (Maver, 2012 as cited by Yoro et al., 2016).

The Kyoto Protocol to the United Nations Framework Convention on Climate Change, according to the Department of Energy (Republic of South Africa, 2012), aims to reduce air pollution, which is blamed for global warming. The agreement requires countries to reduce carbon dioxide and other greenhouse gas emissions. The treaty has been approved by 141 countries, accounting for 55 percent of greenhouse gas emissions, with a pledge to reduce emissions by 5.2 percent by 2012.

South Africa is also committed to reduce carbon emissions and produce clean energy. It has established a Designated National Authority to carry out this function, as well as others related to the successful implementation of the CDM in South Africa, such as promoting investment in CDM projects. (DNA | Department: Energy | Republic of South Africa, 2012).

Research studies on environmental disclosure and its association with environmental performance have traditionally relied on one of two conceptual frameworks: voluntary disclosure theory (Dye, 1985 as cited by Clarkson et al., 2011) or socio-political theories, such as stakeholder or legitimacy theory (Gray et al., 1995). While both speak exclusively to discretionary disclosure, they rely on different disclosure incentives and present opposing predictions. Prior research has failed to demonstrate a consistent and significant relationship.

According to the voluntary disclosure theory, firms with "good news" have an incentive to disclose to prevent an adverse selection problem. This theory is not specific to environmental performance, and most studies have concentrated on the disclosure of economic data. Nonetheless, several studies have used it in an environmental context (Li et al., 1997; Clarkson et al., 2008), arguing that firms with superior environmental performance have incentives to communicate their 'type' of performance by making credible environmental disclosures - those poor performers find difficult to replicate. The theory of voluntary disclosure thus predicts a positive relationship between environmental performance and voluntary environmental disclosure.

In contrast, socio-political theories state that economic issues cannot be meaningfully examined, apart from the political, social, and institutional frameworks in which they exist (Deegan, 2002, as cited by Clarkson et al., 2011). The tension between these frameworks result in power struggles, which are directly related to the concept of 'legitimacy.'

Firms can improve their legitimacy through disclosure, as it is often easier to manage their image, than to make actual changes to their performance, operations, or values (Dowling and Pfeffer, 1975 as cited by Clarkson et al., 2011). In the current context, as stakeholder expectations for corporate environmental performance evolves, firms that fail to meet them, face legitimacy threats. According to Gray et al. (1995), such firms have incentives to increase their environmental disclosures. As a result, the socio-political viewpoint predicts a negative relationship between environmental performance and voluntary environmental disclosure.

Climate change is unavoidable, unless greenhouse gas emissions from fossil fuels are drastically reduced. However, there are numerous market failures related to greenhouse gasses, and limiting greenhouse gas emissions is still heavily reliant on good intentions (Covert et al., 2016). Renewable energy is generating more electricity than any other source (Berke, 2017 as cited by Kaartemo & Gonzalez-Perez, 2020). Regrettably, the era of oil and fossil fuels is far from over (IEA, 2018), and in 2015, fossil fuel subsidies totalled US$5.3 trillion, or 6.5 percent of global GDP (Coady et al., 2017).

Nonetheless, it is estimated that by 2040, at least 40% of the world's power will come from renewable sources and by 2050, the entire planet could be powered by renewables (Wood, 2020). While these statistics show that renewable energy has a bright future, they also show that there has been some delay in the production and adoption of renewable energy on a global scale. Renewable energy sources (solar, wind, ocean waves, hydropower, hydrogen, biofuels, biomass, waste, and geothermal resources) are generally more credible than non-renewables (oil, natural gas, coal and petroleum). However, there is an ongoing debate about the credibility of renewable energy production, which is related to the intermittent, unreliability, and variability in supply to meet demand (Delucchi and Jacobson, 2011).

While the vast majority support renewable energy, there is strong opposition from various interest groups and stakeholders. This is understandable, as renewable energy projects may have a negative impact on the communities where they are located (Gipe, 1995 as cited by Kaartemo & Gonzalez-Perez, 2020).

Several major multinational corporations (MNCs) such as Tata Motors, IKEA Group, AEON, Akso Nobel, H&M, and others have already announced their intention to transition to renewable energy sources (RE100, 2018 as cited by Kaartemo & Gonzalez-Perez, 2020).

It is in the context of the literature review that this study was undertaken at Eskom to explore the employees' perceptions on the use of CCT and analyse the effect of CCT on Eskom and society in general.

3. METHODOLOGY

This research uses an exploratory research design which according to Saunders et al. (2015) is a valuable means of finding out 'what is happening; seeking new insights; asking questions and assessing phenomena in a new light.' A deductive approach was also adopted, since the study was concerned with deducing conclusions from premises or propositions. Data was collected using a questionnaire to conduct a survey through Google Forms. The data was collected using a 5-point Likert scale questionnaire adapted from Toliver (2013).

The population consisted of all employees working at the Eskom head office and the sample size was determined by using the sample size calculator provided by raosoft.com. For a population of 500, a sample size of 218 was recommended However, due to cost and time constraints a sample of 100-125 was targeted, so that valid statistical tests could be conducted.

4. FINDINGS

The reliability and internal consistency of the measuring scale were tested by calculating Cronbach's Alpha scores, as reflected in Table 1.

Table 1: Cronbach's Alpha Score

Measure/Statement	**Cronbach's alpha score**	**Internal Consistency**
Acceptability of Clean Coal Technology (CCT)	0.83469478	Very good
Appropriateness of CCT	0.90700522	Very good
Feasibility of CCT	0.91942016	Very good
CCT - power generation capacity	0.67398519	Acceptable
CCT - per unit cost of production of electricity	0.71557063	Good
CCT - effect on the employment	0.68316955	Acceptable
CCT - government support for capital expenditure	0.77254814	Good
CCT - assist in bringing down the carbon emissions	0.65928201	Acceptable
CCT - general health	0.71534563	Good
CCT - business opportunities in the region	0.63546271	Acceptable
CCT - general infrastructure of the region	0.61753291	Acceptable
CCT - community development programmes	0.68278601	Acceptable
CCT - corporate governance	0.970481423	Very Good
CCT – social responsibility	0.901050247	Very Good

It is evident from Table 1 that all the measures had an acceptable level of reliability since an alpha value between 0.6 - 0.7 indicates an acceptable level of reliability (Hulin et al., 2001).

In terms of validity, since the questionnaire was adapted from Toliver (2013) and Weiner et al. (2017), whose validity was confirmed using Confirmatory factor analysis (CFA), this was not determined in this study.

Most of the respondents were employed in the functional area of administration, management, finance and accounts, as well as in projects. Female and male respondents were almost equally represented in the study.

It is evident from Table 2 that overall, the respondents felt positive about the prospect of CCT. The strongest scores were for '*welcome CCT'* which seems fitting and suitable as the majority of the respondents *welcome CCT* and find it acceptable.

Table 2: Acceptability of Clean Coal Technology

	Meets approval	***Appealing***	***Like CCT***	***Welcome CCT***
Mean	3.30	3.46	3.49	3.67
Standard Error	0.11	0.10	0.10	0.11
Median	3	4	4	4
Mode	4	4	4	5
Standard Deviation	1.18	1.00	1.05	1.12
Sample Variance	1.39	1.01	1.11	1.26
Kurtosis	-0.97	-0.59	-0.99	-1.16
Skewness	-0.21	-0.20	-0.22	-0.22
Range	4	4	4	4
Minimum	1	1	1	1
Maximum	5	5	5	5
Sum	334	350	353	371
Count	101	101	101	101

Table 3 indicates that a mean of 3.60 for ‘’fitting’’, 3.52 for ‘’suitable’’, 3.31 for ‘’applicable’’, and 3.20 for ‘’good match,’’ all of which imply that the majority of the respondents agree that CCT is the appropriate technology to be used.

Table 3: Appropriateness of Clean Coal Technology

	Fitting	***Suitable***	***Applicable***	***Good Match.***
Mean	3.60	3.52	3.31	3.20
Standard Error	0.10	0.10	0.10	0.10
Median	4	4	3	3
Mode	4	4	4	3
Standard Deviation	1.08	1.01	1.05	1.07
Sample Variance	1.18	1.03	1.11	1.166
Kurtosis	-0.79	-0.55	-0.69	-0.40
Skewness	-0.39	-0.56	-0.25	-0.13

Range	4	4	4	4
Minimum	1	1	1	1
Maximum	5	5	5	5
Sum	364	356	335	324
Count	101	101	101	101

The feasibility of CCT was measured by using four variables – implementable, possible, doable, and easy to use. Table 4 indicates that ‘’*Doable’’* got the highest score, indicating that maximum respondents’ view that CCT is ‘’doable.’’ *Easy to use* received the lowest score, indicating that although CCT is feasible, it will not be an easy-to-use technology. A mean of score of 3.06 for ‘’*easy to use’’* indicates that slightly above 50 % of the respondents feel that *CCT is easy to use*

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Table 4: Feasibility of Clean Coal Technology

	Implementable	***Possible***	***Doable***	***Easy to Use***
Mean	3.32	3.48	3.59	3.06
Standard Error	0.11	0.10	0.11	0.12
Median	4	4	4	3
Mode	4	4	4	3
Standard Deviation	1.17	1.07	1.12	1.24
Sample Variance	1.38	1.15	1.26	1.541
Kurtosis	-0.78	-0.69	-0.50	-0.83
Skewness	-0.43	-0.48	-0.73	-0.16
Range	4	4	4	4
Minimum	1	1	1	1
Maximum	5	5	5	5
Sum	336	352	363	310
Count	101	101	101	101

Since a correlation value of above 0.29 is considered as significant (Statistics Solutions, 2021), the data in Table 5 implies that there is a significant relationship between CCT and the power generation capacity of Eskom.

Table 5: Relationship between CCT and Power Generation Capacity

	CCT	***power generation capacity***
CCT	1	
power generation capacity	0.522	1

It is further evident from Table 6 that the p-value of 2.081 is too high, compared to the standard of .05 or less, which implies that the correlation between CCT and power generation capacity may be due to chance and if the use of CCT increases, the power generation capacity may not necessarily increase.

Table 6: Relationship between CCT and Power Generation

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.522							
R Square	0.273							
Adjusted R Square	0.265							
Standard Error	1.0074							
Observations	101							
ANOVA								
	Df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	37.7409935	37.740	37.186	2.081			
Residual	99	100.476828	1.0149					
Total	100	138.217822						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*

Intercept	1.995	0.240	8.30 3	5.33	1.518	2.471	1.518	2.47192 1455
The power generation capacity of Eskom	0.412	0.067	6.09 8	2.081	0.278	0.546	0.27830 3436	0.54677 0232

With regard to the effect of CCT on employment, Table 7 reveals that the correlation value exceeds 0.29, which is considered as significant; hence there tends to be a significant relationship between CCT and effect.

Table 7: Effect of CCT on Employment

	CCT	***Effect on Employment***
CCT	1	
Effect on Employment	0.381	1

It is evident from Table 8 that the p-value is 1.4, which is much higher than the acceptable range of less than 0.05, which indicates that the correlation between CCT and bringing down carbon emissions may be due to chance and is not statistically significant.

Table 8: Relationship between CCT and Carbon Emission

Regression Statistics								
Multiple R	**0.609**							
R Square	0.371							
Adjusted R Square	0.365							
Standard Error	0.937							
Observations	101							
ANOVA								
	df	*SS*	*MS*	*F*	*Significan ce F*			
Regression	1	51.272	51.2 72	58.38 1	1.4			

Residual	99	86.946	0.878					
Total	100	138.218						
	Coefficients	*Standard Error*	*t Stat*	***P-value***	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0 %*
Intercept	1.867	0.213	8.785	**4.85**	1.446	2.289	1.446	2.289
bringing down the carbon emissions	0.500	0.065	7.641	**1.4**	0.370	0.629	0.370	0.629

The correlation value in Table 9 which lies between ± 0.50 and ± 1, is considered as significant; hence there tends to be a significant relationship between CCT and Improving the general health of the community.

Table 9: Relationship between CCT and General Health

	CCT	***Improving the general health of the community***
CCT	1	
Improving the general health of the community	0.55	1

The correlation value in Table 10 is below 0.29, which is considered as insignificant and small; hence there seems to be no relationship between CCT and business opportunities in the region. This indicates that if the use of CCT increases, it will have no effect on the business opportunities in the region.

Table 10: Relationship between CCT and Business Opportunities

	CCT	***Business opportunities in the region***
CCT	1	
Business opportunities in the region	0.0416771.32	1

With respect to the relationship between CCT and the general infrastructure of the region (Table 11), a value of 0.15 which is below 0.29 indicates a small correlation. Thus, there is no relationship between these two variables.

Table 11: Relationship between CCT and Infrastructure

	CCT	***general infrastructure of the region***
CCT	1	
general infrastructure of the region	0.154336862	1

Table 12 reveals that there also seems to be no relationship between CCT and community development programmes.

Table 12: Relationship between CCT and Community Development

	CCT	***community development programmes***
CCT	1	
Community development programmes	0.102239577	1

Table 13 reflects the outcome of the process to determine the correlation between CCT and corporate governance. The correlation values are below 0.29, being between 0.08 to 0.22 for all the 14 constructs, which indicates a small /insignificant correlation, which can imply that the use of CCT will not affect the corporate governance status of Eskom.

Table 13: Correlation between CCT and Dimensions of Corporate Governance

	Correlation
Plays by the rules	0.09
Acts responsibly in its decision making	0.08
Makes honest decisions	0.08
Encourages me to abide by a Code of Conduct	0.09
Works by business ethics	0.14
Rewards ethical work behaviour	0.21
Works by honest business practices	0.13
Conducts business in an honest manner	0.15
Does business in a fair manner	0.12
Works by ethical standards	0.06
Holds employees accountable for their actions	0.16

Is committed to doing the right thing	0.14
Represents itself honestly	0.14
Believes in having the courage to do the right thing	0.22

To test the statistical significance of the correlations in Table 13, the p-value was calculated and the results are presented in Table 14. The p-value for all 14 –dimensions is more than 0.05, hence the correlation between CCT and the 14 dimensions is statistically insignificant.

Table 14: Relationship between CCT and Corporate Governance

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.346							
R Square	0.119							
Adjusted R Square	-0.023							
Standard Error	1.189							
Observations	101							
ANOVA								
	Df	***SS***	***MS***	***F***	***Significance F***			
Regression	14	16.556	1.183	0.835	0.628			
Residual	86	121.662	1.415					
Total	100	138.218						
	Coefficients	*Standard Error*	*t Stat*	***P-value***	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	2.820	0.404	6.979	**0.000**	2.017	3.624	2.017	3.624
Plays by the rules	-0.031	0.259	-0.119	**0.905**	-0.545	0.484	-0.545	0.484
Acts responsibly in its decision making	-0.084	0.248	-0.339	**0.736**	-0.578	0.409	-0.578	0.409

Makes honest decisions	-0.144	0.262	-0.548	**0.585**	-0.666	0.378	-0.666	0.378
Encourages me to abide by a Code of Conduct	-0.060	0.194	-0.308	**0.759**	-0.446	0.327	-0.446	0.327
Works by business ethics	-0.197	0.290	-0.679	**0.499**	-0.774	0.380	-0.774	0.380
Rewards ethical work behaviour	0.394	0.257	1.532	**0.129**	-0.117	0.904	-0.117	0.904
Works by honest business practices	-0.357	0.316	-1.129	**0.262**	-0.986	0.272	-0.986	0.272
Conducts business in an honest manner	0.383	0.348	1.099	**0.275**	-0.310	1.075	-0.310	1.075
Does business in a fair manner	0.134	0.219	0.609	**0.544**	-0.302	0.570	-0.302	0.570
Works by ethical standards	-0.242	0.194	-1.251	**0.214**	-0.628	0.143	-0.628	0.143
Holds employees accountable for their actions	0.063	0.243	0.261	**0.795**	-0.420	0.547	-0.420	0.547
Is committed to doing the right thing	0.156	0.265	0.587	**0.559**	-0.371	0.682	-0.371	0.682
Represents itself honestly	-0.126	0.312	-0.404	**0.687**	-0.745	0.493	-0.745	0.493
Believes in having the courage to do the right thing	0.311	0.208	1.496	**0.138**	-0.102	0.725	-0.102	0.725

Table 15 reveals that there is no significant relationship between CCT and social responsibility.

Table 15: Correlation between CCT and Social Responsibility

	CCT
CCT	1
Encourages to volunteer	0.05
Active in the community	0.06
Has a recycling programme	0.07
The workplace is safe for all employees	0.09
Supports the community	0.09
Concerned about human rights	0.11
Environmentally friendly	0.20
Community service projects	0.12
Good neighbour in the community	0.07
Minimizing the environmental impacts of our business	0.20
Committed to conducting business in a sustainable manner	0.13

5. DISCUSSION

The findings of the study are consistent with some findings reported in the literature reviewed, in the sense that the literature indicated challenges and barriers in implementing and using clean coal technology (Pitso, 2019; Langaugae, et al.2016). The feasibility of CCT is still debatable and no conclusive evidence is provided - either by the literature reviewed or analysis of the primary data collected. The literature reviewed does indicate the acceptance and implementation of CCT in the NDP 2030. However, it is suggested that the capital requirement estimates need to be revised (Coady et al., 2017). Similarly, the respondents in this study are also divided in their responses on the feasibility of the CCT.

The analysis of respondents' views is consistent with those reported in the literature regarding the effect of CCT on Eskom in terms of reducing carbon emissions. The reviewed literature includes a discussion of wet flue gas desulfurization (WFGD), which is an important method of reducing CO_2 emissions (Biznis Africa, 2018 as cited by Pitso, 2019). Similarly, respondents in this study agree that using CCT will help Eskom reduce carbon emissions. According to the literature reviewed, Eskom may use CCT for coal-fired power plants until they are decommissioned (Yoro et al. (2016). This will place a significant financial burden on Eskom; however, the transmission and distribution of electricity generated by other renewable sources will increase Eskom's inflows.

The findings also indicate that the region's business opportunities and general infrastructure structure will remain unchanged, and thus the lives of community members will also remain unchanged, should Eskom opt for CCT. According to the findings, clean coal technology is found to be acceptable, appropriate, and feasible for Eskom. However, the feasibility of CCT remains debatable, with no conclusive evidence provided by either the reviewed literature ((Delucchi and Jacobson, 2011) or analysis of the primary data collected. As a result, it can be concluded that, while CCT appears to be acceptable, its feasibility still remains questionable.

In conclusion, the findings suggest that the implementation of CCT will have no effect on the employment status of the employees of Eskom and the implementation of CCT will have no effect on social responsibility and the corporate governance status of Eskom. However, it should be borne in mind that the data was collected from a sample of 125 respondents; thus the findings may be inconclusive and more detailed research is required before making any sweeping recommendations.

6. CONCLUSIONS

Clean coal technology (CCT) is implementable, but doesn't seem feasible, due to the huge financial implications. Hence, a detailed research project including other stakeholders - like society and government also needs to be included to collect the data, before taking a decision on implementing CCT at Eskom. The employees at Eskom should be assured with regards to their status of employment, if CCT is implemented. However, the employees may need skills training, with regards to the new technology (CCT).

The effect of CCT on society and the environment, including general health will be positive and hence, CCT may be implemented. It will also assist the government in projecting its commitment to reducing carbon emissions at international forums. The 2019 version of the IRP outlines a transition from polluting coal generation energy to renewable sources like solar and wind. The government needs to reduce carbon emissions from coal-emitting power stations and CCT may be a solution.

The effect of CCT on social responsibility and corporate governance may not be apparent; however, South Africa can show its commitment to the world that the country is serious about reducing carbon emissions by accepting clean coal technology. It is recommended that an innovative approach to converting the coal-fired power plants to a clean coal solution might be a win-win for all concerned. (IPPs).

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