ESKOM INVESTMENT SUPPORT PROJECT
ENVIRONMENTAL AND SOCIAL AIDE MEMOIRE

A joint African Development Bank (AfDB) and World Bank (WB) Mission visited South Africa from January 23 to February 31, 2017. The Mission reviewed implementation of the Eskom Medupi Power Project and Eskom Investment Support Project (for WB). It visited the Medupi Power Station site from January 24 -27, 2017 and the Majuba Rail site (WB team only) from January 31 to February 2, 2017. Meetings were held with officials of Eskom, Department of Public Enterprises (DPE), Department of Water and Sanitation (DWS), Department of Environmental Affairs (DEA), and the National Treasury. Annex 9 lists the officials met and Annex 10, the mission members

A. MEDUPI POWER PLANT

Overall Performance

1. Environmental management is generally assessed to be satisfactory and compliant. The Mission was satisfied that the project has demonstrated continued compliance with the regulatory requirements and conditions of authorization by the relevant Government of South Africa authorities on various aspects of air emissions and water quality. The Mission noted that Eskom is also undertaking appropriate remedial measures and procedures to address any systemic risks resulting from implementation of Occupational Health and Safety (OHS) management system.

Sand mining in the Mokolo River

2. The Mission received updates on the status of the legislative actions that have been undertaken following suspension of the sand mining operations in the Mokolo River. The Mission was informed that following completion of the Specialist Study on the environment and social impacts due to the past sand mining activities that preceded the compliance actions taken by the authorities, the Limpopo Department of Economic Development, Environment and Tourism (LEDET) have imposed a fine on the principal sand miner as part of their application for rectification so as to obtain an environmental authorization. The payment of the penalty will pave the way for a decision on the application for an environmental authorization to resume legally authorized sand mining operations. The environmental authorization conditions will be informed by the findings of the Specialist Studies and part of the permitting process, which included public consultation with the affected communities and other interested parties from the operations.

3. The Mission was concerned with the continued delays in communicating the findings and outcomes of the Specialist Study to the farmers who had lodged complaints to the authorities regarding the impact of sand mining activities on their farming operations. Eskom observed that it had no direct control of the ongoing legislative process on the issue but noted that it will continue to urge the Regulators to communicate the findings to the complainants. It was also reported that the Environmental Control Officer (ECO) still monitors this process on behalf of the Department of Environmental Affairs (DEA), including monitoring of any current complaints that try to link Eskom to the sand mining activities. The mission suggested that the Environmental Monitoring Committee (EMC) could be a useful avenue for communicating the findings to the concerned farmers since the Regulators also participate in the EMC meetings.

4. Eskom informed the Mission that Medupi project still required an estimated 31,000 tons of river sand, out of which 13,000 tons is stockpiled, while the balance 18,000 tons is to be sourced for the balance of construction work. Eskom also stated that no sand sources had yet been identified, but that an environmentally, legally and technically acceptable sand supplier would be procured for such future sourcing. It was explained that the status of any complaints, received regarding sand used at Medupi was
critical information for the lenders and Eskom needed to manage them with the utmost urgency to prevent reputational risks to all the development partners.

5. Follow up action:
   a. Eskom to ensure that any future sand requirements of the project will be obtained from only licensed sand miners.

Water supply arrangements for Medupi

6. While Phase 1 of the Mokolo Crocodile Water Augmentation Project (MCWAP Phase 1) has made 30.5 million m$^3$/year of water available, the Mission expressed serious concerns with continued delays in finalizing the financing and construction plan for the MCWAP Phase 2. The Department of Water Affairs (DWA) informed the Mission that MCWAP – Phase 2 was more than two years behind schedule, and would only supply water in June 2023 (from November 2022 communicated during the previous mission of June 2016). The Mission noted that the remaining lead time was then only 8 month, as the remaining three units are planned to be operational with FGD by March 2024. The mission noted that any further delay would jeopardize timely operation of the last three units with Flue Gas Desulfurization (FGD).

7. DEA informed the Mission that in November 2016, the Minister of Water and Sanitation (MSS) approved a revised borrowing limit for a project of 75 million m$^3$/a, taking cognizance of a Cabinet resolution in September 2016 of reducing the capacity to 75 million m$^3$/a, and informed the Minister of Finance. Accordingly the EIA has been initiated. The Mission noted that the MSS must obtain concurrence from the MoF in terms of the Public Finance Management Act (PFMA) for borrowing limit approval, precedent to consideration by the Fiscal Liability Committee. The Mission was informed that a draft Guarantee Framework Agreement (GFA), Water Supply Agreement (WSA) and Implementation Agreement (IA) is ready. It was also noted that a confirmation of availability of fiscal funding is required for the social component before disbursement from loans for the commercial component can commence. The mission requested for more detailed milestones of the project so as to track progress, given the concern over the reduction in the “float” between when water is required for Medupi Unit 4 onwards and water supply through MCWAP II. DWA informed the Mission that it will be able to confirm the milestones once the borrowing limit is confirmed.

8. Follow up actions:
   a. Provide detailed milestone of the project - March 31, 2017
   b. Finalize planning reports based on transfer capacity of 75 million m$^3$/annum and on revised borrowing limit approval – April 2017
   c. Obtain concurrence from Minister of Finance for approval of borrowing limit – March 2017
   d. Secure Project Financing – April 2018
   e. Application to register EIA with DEA – April 2017
   f. Environmental authorization completed – December 2017
   g. Commence construction – June 2019
   h. Water delivery – June 2023

Occupational Health and Safety

9. The mission noted with concern the unfortunate news of two recent fatalities - one at the Unit 3 location of the Medupi Power Plant in July 2016, and the other on one of the WB-financed transmission line contracts (Masa-Ngwedi 400kV Section A) on 8 December 2016. The mission visited the site and assessed the situation that led to the unfortunate incident. The deceased was a subcontractor’s employee on the Boiler contract financed by AfDB. The mission’s assessment indicates that Eskom has robust systems,
protocols and procedures to prevent injuries and accidents at site. However, these protocols were not followed that resulted in the fatality. The full accident report is still awaited, but Eskom informed the Mission about the steps Eskom management has taken to reinforce health and safety procedures. The Mission had extensive discussion with Eskom on taking necessary steps to ensure that such incidents can be prevented in future. Eskom pointed out that it is taking safety issues seriously. The Mission requested Eskom to regularly report injuries and near misses in every quarterly report. The Mission also pointed out the importance of sharing experiences amongst work sites; e.g. Medupi power plant and Transmission.

10. Medupi has a labor camp housing more than 2,000 workers from various Medupi contractors. The Mission visited the labor camp to assess the working and living conditions. The labor camp is well kept, managed and secured. Residents have good access to a clean housing, clinics, sports and food facilities. There are no reports or evidence of any exploitation or violation of any local or national requirements with respect to labor rights or their quality of life. The transmission projects have one labor camp, whereas Majuba Rail has no labor camp.

11. Data presented to the Mission for Medupi showed the actual Lost Time Incidents (LTIs) to be on average lower than the projected target rates, although there was concern that the incidence rate (LTI of 0.19 compared to target of 0.2) was still significantly higher than Eskom would have desired. Like in the previous data, spillages still accounted for the highest number of incidents. Eskom also noted the recent fatality at the plant and the transmission line that cost the lives of two workers, and noted that these incidents triggered a number of actions by the management to ensure that such incidents can be prevented in the future. Planned actions include, among others, training of all Eskom supervisors and contractors on safety during the month of February 2017. The Mission further requested Eskom to inform the financiers of any fatalities when they occur and not wait until an implementation support mission. The site maintains a good EHS record. Below is the 12 month trend of LTI.

Flue Gas Desulphurization System for Medupi

12. The Medupi power station with annual coal consumption of 17,117,436 tons, will contribute CO₂, N₂O and sulphur dioxide emissions to the atmosphere. These emissions represent an increase in the energy sectors emissions by 9.2% and an increase in Eskom’s CO₂ contributions by 7.3%. Since the Medupi area has high Sulphur coal, the project has been designed to use Flue Gas Desulphurization Technology (FGD) to reduce sulphur dioxide emissions. Eskom reaffirmed its commitment and plan to install an FGD system for abatement of SO₂ emissions from the six generation units will each be retrofitted with an FGD unit sequentially. The Mission expressed continued concern over a slipping schedule to meet first operational FGD for U#6 by 2021. The current schedule has U#6 FGD construction starting by April, 2020, leaving an impractical 1.5 years for final construction and commissioning, by August 2021. It was agreed that Eskom would have internal discussions regarding availability of financing (required by May 2018) and commencement.
13. Eskom further informed the Mission that the development funding has been approved by Eskom Treasury and Ministry of Finance and project development and the conceptual design work are underway. Eskom indicated that the project is in the approved budget but had not yet been allocated funds. Eskom has now firmed up the design and a revision on the development budget was approved in November 2016.

14. The Mission expressed concern that Eskom expects that Medupi will not be able to comply with the existing plant standard of 3,500 mg per NM$^3$. This could be a serious issue in view of the fact that future seams of coal from Exxaro mine are likely to have sulphur content higher than 1.7 percent, which will result in possible exceedance of SO$_2$ emission levels. Eskom informed the Mission that blending of coal could in the interim help realize the desired emission levels that meet the emission standards. However, this measure cannot be implemented until the end of 2017 when the coal reclaimer is fully operational and the delivered coal is being systematically delivered and stored with accurate records on sulphur content. The Mission again suggested that Eskom seriously consider an interim strategy to control SO$_2$ emissions for the next six years before the SO$_2$ scrubbers (FGD) are operational. Previous suggestions have included the consideration to adopt a direct furnace limestone injection program which has been tested in the USA and in Europe and shown to reduce SO$_2$ emissions by up to 50%. A field testing program with this technology on Unit #6 or 5 to obtain technical confidence had been suggested earlier, which the Mission reiterated for Eskom's serious consideration.

15. Eskom will continue to refine and improve the schedules to allow the normal minimum of 24-30 months for the first unit completion to Commercial Operation. Detailed designs of buildings and civil works are scheduled for 2017, while all EIA approvals should have been obtained by 2018. Budget confirmation for the actual works should be achieved by end 2018. Eskom will be seeking funding for these works from the market and DFIs.

16. Follow up Actions:
   a. Detailed designs of process package (absorber island) – October 2017
   b. Detailed designs buildings and civil works – October 2017
   c. Environmental Authorization – April 2018
   d. Commencement of Construction – April 2020

**Air Quality Monitoring in Waterberg Area**

17. DEA presented progress on the implementation of the Waterberg-Bojanala Priority Area Air Quality Management Plan (WBPA- AQMP). The overall objective of the WBPA- AQMP is to bring ambient air quality within the Waterberg Bojanala Priority area into full compliance with NAAQS by 2020 in the face of other planned strategic infrastructural developments within the region. Against a baseline obtained from air emissions monitoring inventory up to 2012, dispersion modeling of air emissions projected an increase of all the key elements being monitored (ie; SO$_2$, NO$_2$ and particulates) within the region for 2015, 2020, 2025 and 2030. Furthermore, DEA informed the mission that the model simulation only included documented planned infrastructural developments within the region and will need to be updated to include other potential emission sources which were yet to be documented at the model simulation. Considering that industry was responsible for a greater proportion of the emissions, there is good reason to ensure all industrial sources (documented and not) are captured as input into the AQMP implementation and that knowledge and understanding of air quality amongst stakeholders in the WBPA is enhanced.
Medupi site emission monitoring

18. At the project site, updates provided continued to show satisfactory compliance with ambient air quality standards with respect to dust emissions, NO₂, and SO₂, although with intermittent diurnal spikes of non-compliances due to a variety of reasons. Unit 6 emissions showed particulate matter not exceeding the emission standards, largely on account of installation of high temperature fabric filter bags that have proved more effective. SO₂ emissions where also below the 3,500 mg/Nm³, except on occasions when higher sulphur coal was used. The Mission sought clarity regarding the rational for Eskom’s proposed postponement application for compliance to the Minimum Emission Standard (MES) for the existing plant’s SO₂ emission limits for Medupi and Matimba Power Stations since there did not appear to be an immediate justification to seek postponement of this compliance, especially considering that the current emissions were largely conforming to the 3,500 mg/Nm³ limit. Eskom explained that its application was driven by a concern that both Matimba and Medupi coal fired power stations receive their coal from the Grootegeluk Mine and over the last year there has been a variability and an increase in the average sulphur content of the coal, which could likely increase their respective SO₂ emission levels. Thus, while the power stations average monthly emissions are within the MES limits, there are times when the daily limits for Medupi and Matimba are being exceeded due to the high sulphur content of coal. Considering Eskom’s concern about coal of higher sulphur as the cause of spikes in SO₂ emissions, the mission suggested that Eskom could, in the interim, consider the option of lime injection before installation of the FDG to help realize the desired emission levels. Eskom explained that at the moment, the Medupi plant is unable to undertake blending at the stock yard but steps are being taken to finalize commissioning of the coal reclaimer to enable coal blending. Eskom further informed the Mission that the Grootegeluk Mine has since adopted a blending strategy to try and mitigate the peaks.
19. The ambient air quality monitoring data in last six months indicate that PM2.5 concentrations (against a limit of 40 µg/m$^3$) are high in the morning and evening with peaks observed at 03:00 hours and 05:00 hours and between 20:00 hours and 22:00 hours. The concentrations are lower throughout the day, which is indicative of influence by low-level sources such as domestic combustion and agricultural farming. The NO$_2$ concentrations were high from the early hours of the morning and decreased from 07:00 until 09:00 hours. Concentrations then increase, peak at 15:00 in the afternoon, decrease until 19:00 and increase again throughout the evening against a standard of 106 ppb (1hr). This is an indication that ambient NO$_2$ concentrations at the site are influenced by both tall stack and low-level sources; however, concentrations remained relatively low. Please see the pattern for PM10 against a standard of 75 µg/m$^3$.

**Ground Water Quality Monitoring**

20. Data from the majority of the ground water monitoring wells continued to indicate water quality within acceptable limits. A number of the old monitoring boreholes were rehabilitated in April 2015 due to blockages or obstructions in the boreholes. Special attention was paid to borehole MBH04S, which was flushed with clean water to see if it has any influence on the water quality. The rehabilitation of the boreholes did not have a marked effect on the water qualities. Even in MBH04S that was flushed with water and cleaned out with compressed air there was little or no change in the water quality. Point source pollution has therefore been ruled out. The Ground Water assessment monitoring concluded that groundwater quality conditions varied significantly within relatively short distances, as a result of compartmentalization caused by groundwater flow barriers (geological structures) as well as varying aquifer host rock. Eskom will further investigate the issue.

**Regional Environment and Social Assessment (RESA)**

21. With the conclusion of the Regional Environmental and Social Assessment (RESA) of Coal Fired Power Generation along the Botswana – South Africa Border stating that with currently available data and using reasonable assumptions, the level of the proposed coal-based energy generation program in the border region would lead to significant exceedances of prescribed environmental standards in many cases, it is still the expectation of the Mission that these findings should find their way to inform and influence energy planning in the two countries. While it is recognized that coal will form an integral part of the strategy to meet base-load generation demand in the short term, the findings of this RESA will assist decision-makers in making the case for alternative technologies, programs and location of future coal-fired power plants in the longer term. The Mission underscored the significance of this, especially considering that the Department of Energy had embarked on the review of the Integrated Resource Plan (IRP), and the
RESA recommendations would assist decision-makers in making the case for alternative technologies, programs and location of future coal-fired power plants in the longer term.

22. The mission was further informed that the Department of Environmental Affairs has embarked on a process to subject the scenarios upon which the study was undertaken to a further analysis to determine if the scenarios are still valid under the country’s current and medium term energy planning strategy. This will assist to inform on how best to take the RESA outcomes and recommendations forward. The significant developments regarding the Renewable Energy Program in South Africa since 2014 should be taken into consideration when assessing the validity of the five scenarios on which the RESA Study is premised and could be used as a basis to revise the energy planning in the area of influence in the future. The up-take of coal Independent Power Producers (IPPs) as well as plans for Oil and Gas should be considered for the energy planning in the area of influence in the future.

**Status of Heritage Impact Assessment of Grave Sites at Medupi**

23. The Mission noted that Eskom was maintaining a continuous engagement with the affected community following completion of the ceremonies for the graves. However this being an important issue still being monitored under the Independent Review Mechanism of the AfDB, the Mission requested Eskom to provide an update on the implementation of any ongoing activities of the Heritage Action Plan (HAP) since the conclusion of the traditional rituals last year.

**Citizen engagement through Environmental Management Committee**

24. The mission received an update on the last three EMC meetings which discussed important issues relevant to the project, including feedback on heritage matters at Medupi, air and water quality monitoring. Through these meetings the EMC continues to be a platform for giving feedback to and from the communities in the project area. The 40th Medupi Environmental Monitoring Committee Site Visit and Meeting took place on 13 October 2016, which was attended by EMC Members, Project and Contractor staff and delegates from the DEA and DWS. EMC meeting held on 28 November 2016, attended by members discussed various issues such as comments from the Environmental Control Officer (ECO; water management; and animal mortalities. EMC members continue to actively discuss topics of interest to community, such as their own observations made during the site visit, ECO observations, water quality monitoring and air quality/emissions performance. The EMC requested Eskom to further investigate and report during the next meeting control of ash dust, as well as progress on outstanding actions for construction of wash bay, service bay, hazardous waste and associated infrastructure.

**B. MAJUBA RAIL**

25. The implementation of the Majuba Rail and Transmission lines project is in compliance with South Africa’s National Environmental Management Act given that OP 4.00 on the use of country systems is applicable to the project. The Mission found the environmental supervision of the construction works (which are now 100% completed), undertaken by both an independent environmental auditing firm and Eskom’s environmental experts, to be exemplary. Monthly site assessments on diverse environmental issues are continuously reported by an Environmental Control Officer (ECO) who reports monthly to the Department of Environmental Affairs (DEA). Parameters monitored include water quality, air quality, dust, noise, waste handling and disposal, including contractor’s overall environmental performance on the construction sites, The mission reviewed the ECO’s compliance audit report for the month of November 2016 which indicates 93% compliance rate for the railway line and implementation of its associated EMP (a 4% compliance rate increase from the last supervision mission undertaken in May 2017), and 97% compliance rate for the 88kV transmission line and implementation of its associated EMP (which remains the same from the last supervision mission). Therefore, the overall environmental performance of the Majuba rail and transmission project is **satisfactory** for all safeguard policies triggered.

**Environment, Health and Safety (EHS) Performance at the construction sites:**
Accidents record: The project indicates an excellent EHS performance with current month Lost Time Incident Rate (LTIR) of zero (against a target of zero for Eskom) and Zero (against a target of zero) for contractor. Total number of safety incidents since inception stands at x, with majority incidents relating to requirements of first aid and basic medical attention. There were no fatalities recorded on this Project since the commencement of the construction activities.

Contractor's Health and Safety Performance: The Mission was pleased to note the overall good management of health and safety issues at the construction site. The Contractor has designated Safety, Health and Environmental Officers (SHE) who oversee the implementation and monitoring of the Contractor’s Environmental Protection Plan. A health and safety plan is also in place and implemented satisfactorily as evidenced in the use of Personal Protective Equipment (PPE) and from the report presented to the mission by the Eskom SHE Manager.

The mission also discussed the contractual requirements on managing contractors’ labor. The contractors do not make use of specific labor camps on site. The professional and skilled labor usually come from other parts of South Africa and these workers are accommodated in rented housing in the closest towns to the construction site. The earthworks contractor also rented two municipal compounds as accommodation for semi-skilled staff. With the contract completed, this arrangement has also come to an end. Unskilled labor have mostly been and are recruited locally in the different towns adjacent to the railway line with the respective contractors providing transport to and from the work site. There were some work stoppages to labor unrest, but these mostly related to situations outside the control of the respective contractors. One such a case occurred when the local communities refused to allow the workers to leave their accommodation as a method to direct attention on their general grievance with poor service delivery by the Local Authorities.

The mission discussed the overall plans of Eskom to accommodate the current road transport contractors and their staff once the coal transport is shifted from road to rail. Eskom informed the mission that all road transport contracts expire in March 2018 and that Eskom will then decide how many contracts to award based on the actual demand for road transport. The mission noted that the current contracts are three-year call contracts not tied to specific sites, power stations or mines. Road transporters are paid a flat rate for coal transport and receive instructions from Eskom where to transport coal at any specific time.

Site Observations:

Railway embankments, bridges and culverts: Challenges still remain in controlling soil erosion on the railway embankment along the servitude and where culverts and bridges have been constructed, and poor drainage works to effectively manage the stormwater. The Mission observed that following the recent rains in the project area, most railway embankments are severely eroded causing siltation of culverts and water ponding at the culvert outlets. Culverts were found to be constructed perpendicular to the railway formation without taking into consideration the direction of the stream flow and in some areas culverts were not placed or aligned with the natural watercourse or drainage line or are constructed higher or below the natural ground level causing severe water ponding. The mission also observed lack of vegetation cover in some areas on railway embankments or vegetation cover which has been eroded by rains. The mission recommends that the contractor apply soil erosion control and slope stabilizing measures such as building retaining walls using gabions, using appropriate material at the base of slopes, soil profiling, compaction and planting of vegetation cover on the railway embankments. The culverts should be constructed/placed in a manner that prevents ponding of water and facilitates drainage. The poor drainage system poses a long-term potential risk on the stability of the railway line if the silted culverts are not cleaned.

Borrow pits: The mission was pleased with the rehabilitation works that have been carried out at the borrow pits visited (borrow 16 and 24). All the excision cuts have been levelled to an appropriate slope, and the revegetated. Rehabilitation works are still on-going at borrow pit 24, but the mission was pleased with slope stabilization and rehabilitation works that have been carried out since the last mission in May 2016.
32. **EMS Certification-ISO 14001 by Third Party**: The mission was pleased to note that the Majuba Eskom has retained an ISO 14001 certified Environmental Management System for Medupi. This indicates that Eskom maintains a well-functioning Environmental Management System (EMS), which is accredited by an independent third party and in compliance with ISO 14001 standards.

33. **Key Action Items**: There is an urgent need for the contractor to implement measures to control erosion and siltation of culverts along the servitude of the railway embankments.