



ENERGY SYSTEM PLANNING (PTY) LTD COMPANY EXPERIENCE (PROJECTS)





Transaction advisory services for NamPower IPP procurement project

Technical adviser to NamPower on IPP procurement. The technical analysis comprised the analysis of the local power demand/supply to establish the justification and rationale for the procurement of additional supply capacity; the establishment of the appropriate technology that can be implemented within the project timelines and a cost-benefit analysis of the proposed project. The technical advisory service gave the client the supply shortfall over the medium to long-term and the most suitable plant size and technologies to achieve objective. We also motivated for the project based on a cost-benefit analysis on the Namibian economy; recommended a project structure and highlighted key legislative and regulatory challenges and recommending possible mitigations.

Transaction advisory services for the Lower Maguduza Hydro Power Plant Scheme in Swaziland

Transaction advisory services to the Swaziland Electricity Company for the IPP bidding process for the development of a 15 MW Hydro Power Plant; the project included the technical, commercial and legal reviews of the project, development of tender strategy, preparation of tender documents for IPP procurement, launching of the tender process, management of IPP bidding period, evaluation of bids and selection of preferred bidder and assistance with negotiation and contract execution.

Transient stability studies on the integration of Medupi Power Plant for Eskom

The aim of the project was to provide a solution for the integration of the Medupi Power Plant to provide a critical fault clearing time of at least 80 ms at the Medupi and Matimba 400 kV busbars. This entailed conducting transient stability studies on the integration of the Medupi Power Plant in the Limpopo West Corridor. Initially studies were conducted on solutions proposed by Eskom Grid Planning and subsequently ESP conducted studies on alternative solutions.

Geospatial study to integrate Renewable Energy Independent Power Producers into the Eskom grid

Responsible for conducting a geospatial study to strategically integrate 150 Renewable Energy Independent Power Producers into the Eskom grid. We were also required to provide geospatial maps for the integration schemes and indicative cost estimates for the connection works.

Transmission studies on SAPP network for the development of the ZIZABONA project

Responsible for detailed transmission studies on the impact of the ZIZABONA project on the Eskom network. The studies involved modelling of the Southern African Power Pool networks, steady state, contingency analysis and transient stability assessment to establish the power transfer limits.



Technical due diligence on Renewable Energy projects for equity investors

Project involved the technical due diligence on several renewable energy projects in South Africa for an international private developer. The projects assessed totalled to over 500 MW of renewable energy generation capacity. The due diligence entailed assessment of the connection arrangement, technology review, technical fatal flaws and risk analysis, review of EPC specification and review of the environmental impact assessment. The aim of the assignment was to assist the developer in identifying suitable projects for equity investment in the purpose of bidding under REIPP.

Transaction advisory services for development of wind farms in South Africa

Technical advisor to Independent Power Producers for various wind farm sites totalling over 1000 MW of wind farm capacity located in the Northern Cape in South Africa. The advisory services included fatal flaws analysis, power plant technology, transmission integration studies, power plant sizing, costing, technology, technical risk assessment, and project preparation for Eskom REIPP tender.

Gas market study for Mozambique and North East South Africa for Sasol Petroleum

Responsible for gas demand forecasting, market analysis, and regulatory review and supply side analysis for the gas from Temane gas fields in Mozambique.

Technical advisor to Sasol on Gas Engine Thermal Power Plant within a SAPP Country

Responsible for advising on the project structuring, transmission system development for transport of power, preparation of risk allocation matrix, power purchase agreement, assessment of project bankability, and assistance in negotiations.

Development of gas strategy for the City of Johannesburg

Project involved the development of a gas strategy for the City of Johannesburg to improve diversity of fuel use, energy efficiency, greenhouse gas reduction and less reliance on electricity. As sub-consultant to SAHA, ESP was responsible for methodology development, demand analysis, energy substitution studies, development of avoided cost model, technical options screening, and general interface with the team.

Technical advisor for Vridi Gas Fired Power Plant project for a private developer in Cote D'Ivoire

Technical advisor for the development of a 120 MW combined cycle gas turbine (CCGT) project at Vridi in Cote D'Ivoire operating on natural gas. The assignment involved fatal flaws analysis, review of the key project agreements (including the power purchase agreement, engineering procurement and construction (EPC) contract, and transmission agreements), and assistance in the preparation of the project information memorandum for purposes of marketing the project to potential financiers.



Technical advisor to Sasol on the development of a Large Scale Power Plant within a SAPP country

Responsible for advising on project structuring, transmission system development for long distance (over 1500 km) transport of power, preparation of risk allocation matrix, power purchase agreement, transmission wheeling agreements, development of a financial and cost benefit models, project implementation plan and responsibility matrix, assessment of project bankability, and assistance in negotiations.

Project development expert for the Nile Basin Initiative

Responsible for establishing key transactions and institutional structures that will be required for the successful development of a suite of new power plants within the twelve member countries of the Nile Basin Initiative. The project involved review of long term power sector generation and transmission plans, arrangements for the power purchase agreements and trading, and mechanisms that will need to be instituted to achieve bankable projects in the member countries.

Project leader for the Swaziland electricity cost of supply study

Team leader for the development of a new tariff structure and tariff levels for the Swaziland Electricity Company based on the new cost tariff methodology developed by the Swaziland Electricity Regulatory Authority. The project involved review of long term power sector generation, transmission, and distribution plans, development of long run marginal costs of generation, transmission and distribution, determination of the electricity cost of supply, and setting of new tariffs.

Transient stability assessment of the Eskom transmission system for REIPP

Responsible for the transmission studies to establish the transient stability limits on transmission system for the connection of renewable energy power plants under the REIPP scheme. The purpose of the study was to determine the maximum renewable plant capacities that can be connected at various locations on the transmission system as limited by the transient stability critical clearing times. The result will provide guidance to Eskom and developers as to the amount of renewable generation capacity that can be injected into the network. The study involved detailed time domain transient simulations on the Eskom transmission system.

Technical advisory services for development of wind farms for Crenersol Renewable Energy in South Africa

Technical advisor to Independent Power Producers for a 60 MW wind farm generation plant located in South Africa. The advisory services included transmission integration studies, power plant sizing, costing, technology, and technical risk assessment.



Transaction advisory services on the Biomass to Energy Power Plant for the Central Energy Fund in South Africa

Technical advisor to Central Energy Fund on an 8 MW wood waste power plant to be located in the Western Cape. The advisory services included fatal flaw and feasibility assessment, review of the appropriate technology, review of the site selection and EIA, review of the contractual arrangements, review of power purchase agreement, connection arrangements assessment of the network integration, risk assessment, and review of the financial model. The power plant will make use of wood waste from wood mills possibly supplemented by forest waste.

Transaction advisory services on Photovoltaic Solar Projects for Mulilo-Yingli in South Africa

Technical advisor to an Independent Power Producer for two solar power plant projects with a total capacity of 20 MW located in the Northern Cape in South Africa. The advisory services included transmission integration studies, power plant sizing, costing, technology, and technical risk assessment in preparation of the Eskom REIPP tender.

Transaction advisory services on further privatisation of Kenya Generation Company

Technical advisor to the privatisation commission in Kenya for the privatisation of the government owned generation company KenGen. The primary purposes of the privatisation included capital raising to fund new generation capacity in the country, enhancing efficiency through innovation and expertise, and improvement in corporate governance. The project involved a review of the legislative and market environment in Kenya, due diligence of KenGen, a review of the need for privatisation of KenGen and alternatives for raising funding, recommendations on options for privatisation (e.g. through capital market debt raising/bonds at the company level, private sector participation in special purpose vehicles, and smart partnerships), and implementation of the selected privatisation process.

Transaction advisory services for 300 MW Coal Fired Power Plant project in South Africa

Lead advisor to an IPP for the development of a 300 MW power plant in South Africa in response to Eskom's medium term power purchase programme. Overall responsibilities included conducting project feasibility studies, developing the project implementation plan, developing the contractual framework, review of the Power Purchase Agreement, fuel supply arrangements, costing and pricing, preparation of the technical specification and EPC contract, review of the transmission agreements, review of land issues, management of the site selection and EIA processes, conducting the transmission integration studies, and overall project risk assessment.

Risk assessment on a loan for Medupi 4800 MW Coal Fired Power Plant for African Development Bank

Advisor to the African Development Bank in their assessment of the risks associated with granting of a loan to Eskom towards mitigation of the funding shortfall experienced by Eskom for the construction costs of the 4800 MW Medupi coal fired power station. The risk assessment included analysis of sectoral, institutional and sovereign, and project risks which could impact on Eskom's ability to repay the loan. Following the risk assessment, a loan of around Eur2.5 billion was approved.



Technical advisor for the Swaziland 300 MW Coal Fired Power Station

Team leader for feasibility study of a 300 MW coal fired power station project in Swaziland. Aspects dealt with in the project were the due diligence and fatal flaws analysis, including assessment of project demand/supply balance, project rationale, project size, technology, assessment of coal to be used, risk assessment, choice of public versus private sector procurement, preparation of cost estimates, estimates of electricity price, and implementation plan. The project was extended to include full feasibility studies on the power plant and management of the coal exploration process.

Power sector investment plan for Uganda

Team leader for the development of a long term power sector investment plan for Uganda including electricity generation, transmission and distribution. The project entailed development of a demand forecast, long term generation planning, transmission and distribution plans, the development of an overall planning process, and a financing plan.

Transaction advisory services for 1800 MW Coal Fired Power Plant project in South Africa

Lead advisor to an IPP for the development of a 1800 MW power plant in South Africa in response to Eskom's and multi-site base load programme. Overall responsibilities included conducting the fatal flaws, developing the project implementation plan, developing the contractual framework, review of the PPA, fuel supply arrangements, costing and pricing, preparation of the technical specification and EPC contract, review of the transmission agreements, review of land issues, management of the site selection and EIA processes, conducting the transmission integration studies, overall project risk assessment.

Sub-synchronous resonance studies on the Great Britain transmission system in the United Kingdom

Responsible for specialist studies to establish the risk of sub-synchronous resonance (SSR) occurring on the Great Britain transmission system due to the planned installation of series capacitive compensation along the Scotland/England corridors. The purpose of the study was to identify the power plants at which there is a material risk of SSR occurring under contingency conditions. The study was based on frequency scanning methods.

Transmission studies and commercial advisory services for the Lubovane Hydro Plant in Swaziland

Responsible for power system studies and financial analysis to determine whether the Lubovane Hydro Power Plant was financially and technically viability. The power system studies involved loadflow studies, contingency analysis, fault level studies and transient stability studies to establish power evacuation requirements and Grid Code compliance of the power plant. A financial analysis was also performed to establish whether the project is financially viable. The financial analysis involved developing a financial model to establish the cost of producing electricity from the power plant and a cost benefit analysis to establish the electricity value from the power plant based on the cost of alternatives.



Swaziland tariff study

Team leader for the development of a new tariff structure and tariff levels for the Swaziland Electricity Company. The project involved review of long term power sector generation, transmission, and distribution plans, updating the demand forecasts, development of long run marginal costs of generation, transmission and distribution, development of a financial model for determining revenue requirements, and setting of new tariffs.

Technical and commercial advisory services for developer on solar PV project in Ghana

Project involved the pre-financial close technical and commercial due diligence on a 70 MWp solar PV project to be located in Bole in Ghana. The due diligence entailed overall assessment of the proposed technology, energy yield assessment, development of financial models, assessment of the connection arrangement, assessment of contractual arrangements including EPC, PPA and government support agreements, fatal flaws and risk analysis for project bankability.

Power System Stabilizer Tuning of Hwange Power Station

Responsible for determining optimal PSS settings at Hwange Power Station. The work involved modelling of the Zimbabwe transmission system and interconnected SAPP system including the modelling of the excitation systems at Hwange Power Station; confirming the excitation system model by implementing the measurement and test plan; system studies to determine the transient and small signal stability margins at Hwange Power Station and determining the most suitable PSS settings; verifying the appropriateness of the Power Oscillation Damping (POD) setting at the Insukamini Static Var Compensator (SVC) and the PSS at Kariba South Power Station and assisting ZETDC on implementing the PSS settings for selected Hwange Power Station units.

Technical advisory services for the integration of coal fired power plant in Mozambique and Botswana

Responsible for conducting the power evacuation studies including load flow and short circuit studies to identify feasible and preferred options for connecting the power plants to the power grids in Botswana and Mozambique and to provide indicative cost estimates for the connection works.

Technical advisory services for the integration of the Thabametsi power plant in South Africa

Responsible for conducting integration studies for the integration of a 600 MW coal fired power plant in the Lephalale region close to Medupi power station. The integration studies involved steady state, transient stability and fault level studies in three phase and single phase. The aim was to determine whether the integration of the Thabametsi power plant will meet the Grid Code requirement.



Grid connection studies for international developer for the development of a 400 MW gas power plant project in Tanzania

Project involved grid connection studies for an international developer for a proposed 400 MW gas power plant to be located in the Mtwara area in Tanzania. The power plant was to connect to Songea substation which is 560 km to the west using a 400 kV transmission line. The project assessed the need for intermediate 400 kV substations (to achieve acceptable voltage regulation and to supply projected loads) and the sizing of reactive power compensation devices including reactors, capacitors and static var compensators to ensure compliance with the Tanzanian Grid Code. A cost estimate of the proposed substations and reactive compensation was also prepared.

Technical and commercial advisory services for developer on solar PV project in Tanzania

Project involved the pre-financial close technical and commercial due diligence on a 10 MWp solar PV project with battery storage system to be located in Tanga in Tanzania. The due diligence entailed overall assessment of the proposed technology, energy yield assessment, development of financial and economic models.

Technical advisory services for NamPower generation despatch modelling

Technical advisor to NamPower in developing functional specifications for a software tool to simulate optimal generation dispatch for the Namibian power system. The tool was to be used to determine the expected cost of generation for purposes of estimating the impact of different supply scenarios on the electricity tariffs and on NamPower's financial sustainability.

Technical advisory services to City of Johannesburg on the Kelvin Power Station PPA

Teamed up with other parties to provide advisory services to City of Johannesburg (CoJ) on the Kelvin Power Station PPA. The work involved identifying the key risks on critical issues from an overall project perspective for the current situation and for the future years; the review of the interim report containing the legal and other implications of the current situation, as well as the risks on critical issues to inform further project activities and focus; the overall review of the current state and provide input and guidance to the PMO and work stream leaders; identifying key issues that will arise in the event that Kelvin is repowered/refurbished and identifying other options available to the CoJ.