a world class African city

		REFERENCE	REV
TITLE:	Terms of Reference for Energy Projects Consultant	CP_EMTOR_001	1
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INTRODUCTION

City Power is on the drive to implement strategic energy projects. Strategic energy projects include energy efficiency, installation of rooftop PV Panels, battery energy storage systems (BESS), gas generation, liquefied petroleum gas (LPG) reticulation, waste to energy and Electric Vehicles (EV) within the City of Johannesburg (CoJ) area.

City Power has been mandated to offset the energy usage within City of Johannesburg (CoJ) infrastructure using more energy efficient solutions. This is in accordance with the provincial mandate towards a greener economy to lower the energy demand of government buildings from the grid.

Implementation of BESS and solar PV will assist in the reduction of carbon emissions as well as saving energy cost for City Power and CoJ as a whole.

The ever developing urbanization and the capacity constrains being experienced by City Power has led to high substation electrical consumption. The notified maximum demand and installed capacity not being able to supply surrounding areas. Thus costing the business financially and affects performance. There are also substations that experience regular outages due to the overloading of transformers. The BESS will help with peak shaving, stabilizing the network and lower technical losses. BESS will add another revenue stream by saving on the excess charges and purchasing electrical energy at off peak rate. The BESS will also provide some form of relief in terms of network loading and allow some deferment of expansion while improving security of supply.

City Power has three diesel fuelled Curtiss-Wright gas turbine generators in John Ware, Durban Street and Cottesloe. The gas turbines are not in a condition that City Power can run them reliably. Because of the age and unreliability of the gas turbines, there should be consideration to scrap them and pursue deployment of new gas turbines. There is also consideration to deploy LPG for cooking and space heating which will play a significant role reducing electricity peak demand (ADMD) and thus achieving the environmental friendly sources benefits.

The City of Johannesburg (CoJ) has a constitutional duty to ensure service delivery. This includes municipal solid waste (MSW) management services, a function of which is conversion to energy, treatment and disposal of MSW.

South African car manufacturers are announcing their intention to enter the Electric Vehicles (EV's) industry in response to global trends and the pressure to reduce greenhouse gas emissions, therefore an increase in EV's is expected on the South African roads. Therefore, City Power infrastructure must ready to supply power for electric vehicles charging stations.

1. OBJECTIVE

The main objective of the feasibility studies and design is to ensure that City Power conceptualise and implement strategic energy projects.

2. SCOPE OF WORK

The scope of work shall include all the stipulated elements within this document. The consultant shall be responsible for all the work to be executed within the terms of reference and the quotation provided. The Consultant shall:

2.1. Energy Efficiency

2.1.1. Conduct technical feasibility studies and implementation plan for CoJ infrastructure targeted for energy efficiency.
2.1.2. Conduct financial feasibility studies on the capital requirements, procurement plans, expected savings, payback period (i.e. Return on Investment (RIO)) and bankability studies with a business case.
2.1.3. Conduct analysis on energy efficiency legal requirements.
2.1.4. Compile policies, standards, strategies, specifications, procedures and guidelines for the energy efficiency solution.
2.1.5. Provide a report and a presentation on how best the project can be implemented.
2.1.6. Execute and manage Energy Efficiency implementation until the project is fully functional and skills are transferred to City Power employees.
2.1.7. Where necessary and possible seek funding on behalf of City Power

2.2. Battery Energy Storage Systems and Rooftop Solar PV

2.2.1. Conduct technical feasibility studies of all City Power and CoJ sites targeted for BESS and solar PV systems.
2.2.2. Construct detailed designs of the battery energy storage systems and solar PV to be implemented at City Power sites and its other stakeholders (COJ) based on the feasibility studies.
2.2.3. Conduct financial feasibility studies on the capital requirements, procurement plans, expected savings, payback period (i.e. Return on Investment (RIO)) and bankability studies with a business case.
2.2.4. Conduct analysis on BESS and solar PV legal requirements.
2.2.5. Compile policies, standards, strategies, specifications, procedures and guidelines required for BESS and solar PV.
2.2.6. Conduct electric network and infrastructure impact studies
2.2.7. Provide a report and a presentation on how best the projects can be conducted.
2.2.8. Execute and manage solar PV and BESS implementation until the project is fully functional and skills are transferred to City Power employees.
2.2.9. Where necessary and possible seek funding on behalf of City Power

2.3. Gas to electricity generation

2.3.1. Conduct market analysis on the worth of scrap value for the existing City Power existing gas turbines.
2.3.2. Conduct feasibility studies and analysis on gas to electricity generation.
2.3.3. Conduct financial analysis which includes capital cost, operational cost and return on investment (ROI) on gas to electricity generation.
2.3.4. Conduct analysis on best ownership or partnership (Independent Power Producers (IPP)) models.

2.3.5. Construct a detailed design for the gas to electricity generation based on the feasibility studies.
2.3.6. Conduct analysis on gas to electricity generation legal requirements.
2.3.7. Compile policies, standards, strategies, specifications, procedures and guidelines for gas generation.
2.3.8. Provide a report and a presentation on how best the project can be conducted
2.3.9. Execute and manage solar PV and BESS implementation until the project is fully functional and skills are transferred to City Power employees.
2.3.10. Where necessary and possible seek funding on behalf of City Power.

2.4. Natural piped gas reticulation

2.4.1. Conduct feasibility studies, impact and financial analysis which includes capital cost, operational cost and ROI based on the following natural gas reticulation ownership options:
2.3.4.1.1. Egoli gas natural gas reticulation license renewed.
2.3.4.1.2. City Power to take ownership of the natural gas reticulation.
2.3.4.1.3. Allow third party (IPP) to be in charge of the natural gas reticulation.
2.4.2. Conduct assessments on the layout design, capacity and reliability existing infrastructure.
2.4.3. Construct a detailed design for the gas reticulation based on the feasibility studies
2.4.4. Conduct analysis on natural piped gas reticulation legal requirements.
2.4.5. Compile policies, standards, strategies, specifications, procedures and guidelines for natural piped gas reticulation.
2.4.6. Provide a report and a presentation on how best the project can be conducted.
2.4.7. Execute and manage natural piped gas reticulation implementation until the project is fully functional and skills are transferred to City Power employees.
2.4.8. Where necessary and possible seek funding on behalf of City Power

2.5. Liquefied petroleum gas (LPG) deployment

2.5.1. Conduct feasibility studies and financial analysis which includes capital cost, operational cost and ROI on LPG deployment.
2.5.2. Conduct analysis of the impact of LPG being used for cooking and space heating and the impact this might have on the evening peak demand (ADMD reduction).
2.5.3. Construct a detailed methodology for the deployment of LPG based on the feasibility studies.
2.5.4. Conduct analysis on LPG legal requirements.
2.5.5. Compile policies, standards, strategies, specifications, procedures and guidelines for LPG.
2.5.6. Provide a report and a presentation on how best the project can be conducted.
2.5.7. Execute and manage LPG implementation until the project is fully functional and skills are transferred to City Power employees.
2.5.8. Where necessary and possible seek funding on behalf of City Power.

2.6. Waste to energy

2.6.1. Conduct feasibility studies and financial analysis, which includes capital cost, operational cost and ROI for solid waste to energy and conversion of wastewater to energy.
2.6.2. Conduct assessment on the best location to deploy waste to energy systems (stakeholders: Pikitup and Johannesburg Water).
2.6.3. Compile policies, standards, strategies, specifications, procedures and guidelines on waste to energy systems.
2.6.4. Provide a report and a presentation on how best the project can be conducted.
2.6.5. Execute and manage waste to energy implementation until the project is fully functional and skills are transferred to City Power employees.
2.6.6. Where necessary and possible seek funding on behalf of City Power.

2.7. Electric Vehicles

2.7.1. Conduct analysis on how much energy capacity will be required for EVs charging stations deployment.
2.7.2. Conduct network and infrastructure impact studies.
2.7.3. Conduct analysis on best ownership or partnership (Independent Power Producers (IPP)) models.
2.7.4. Conduct analysis on electric vehicles legal requirements.
2.7.5. Compile policies, standards, strategies, specifications, procedures and guidelines for procuring electric vehicles, buses and charging stations.
2.7.6. Provide a report and a presentation on how best the project can be implemented.
2.7.7. Execute and manage Energy Vehicles implementation until the project is fully functional and skills are transferred to City Power employees.
2.7.8. Where necessary and possible seek funding on behalf of City Power.

3. BRIEFING

The consultant shall be required to brief the City Power's involved stakeholders at the end of the feasibility study and design in a workshop type of a meeting. The briefing shall be in the presentation format.

4. DOCUMENTATION

4.1. Service provider shall provide all documentation on handover to City Power at the end of the project (Hard and electronic format).

4.1.1. Presentations.

4.1.2. Feasibility studies reports.

4.1.3. Detailed designs.

4.1.4. Impact assessments reports.

4.1.5. Minutes.

4.1.6. All documentation utilised for achieving the above.

4.2. All the project information shall remain confidential and the property of City Power. The consultants or its subsidiaries companies shall not take part in any tender relating to the above and shall not disclose this information to the third party.