RUSTENBURG
GIRLS' HIGH SCHOOL

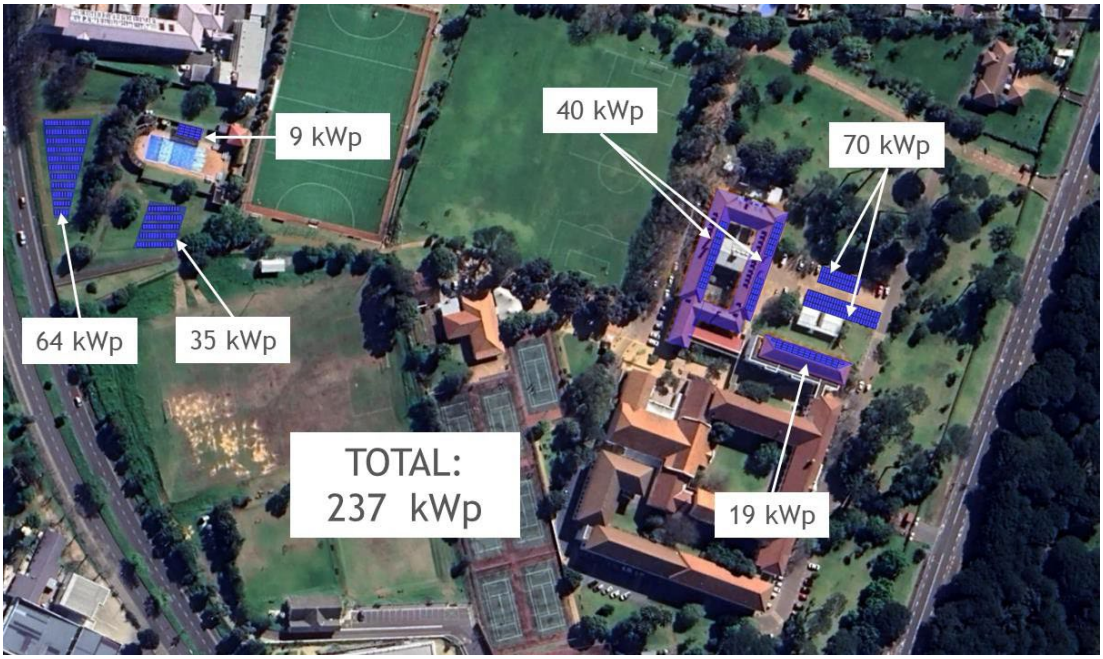
REQUEST FOR PROPOSAL

SOLAR PV AND BATTERY BACKUP PROJECT

1 Objective

In line with our long-term objective to become carbon neutral and more self-sufficient, Rustenburg Girls' High School (RGHS) is looking to install a solar PV system with battery back up to reduce the school's reliance on Eskom for its electricity supply. The long-term objective is to be fully independent from Eskom and functionally sustainable.

The proposed areas for the solar/PV installation are shown in the aerial photograph below:



2 Invitation to Contractors

Suppliers are invited to provide a proposal for a solution, including system design, supply of materials, installation, testing, commissioning, all relevant certifications, permit applications and regulatory requirements. The contractor is also to supply a proposal for the maintenance, performance monitoring and warranty management of the installed system. Proposals shall be based on an outright capital purchase of the system, with separate line items for maintenance, insurance and warranty management (priced per annum).

The contractor is expected to demonstrate and ensure full compliance with all relevant local standards and by-laws associated with Solar PV and small-scale embedded generation (SSEG) systems within the City of Cape Town municipal jurisdiction and the Department of Transport and Public Works.

3 Contractor Qualifications

The following factors will be considered when evaluating the suitability of contractors for this project:

- Track record within the City of Cape Town for Small Scale Embedded Generation (SSEG)
- Local in-house capability for long-term support and maintenance
- SAPVIA PV Green Card registered
- Able to demonstrate level of BBBEE compliance
- Accreditation or registration with a financial institution would be advantageous

4 Tender Process

4.1 School Contact Person

Name:	Craig Leith
Mobile:	0677 867 004
Office:	021 686 4066
Email:	leithc@rghs.org.za

All queries relating to this RFP must be directed in writing (email) through this contact. Clarifications will be shared with all invited contractors.

4.2 Proposal Submission

Proposals are to encompass the following:

- Description of system and layout
- System design/yield report (e.g. Helioscope)
- Technical data sheets and documentation

Final proposal and all supporting documents must be submitted in hard copy format by 16h00 on the closing date for proposal submissions at the School, addressed as follows:

For Attention: Ms S. Ebrahim

Rustenburg Girls' High School

44 Campground Road, Rondebosch

7700

(Please refer to section 5 - ***Project Schedule****).*

4.3 Proposal Evaluation

Proposals will be evaluated based on the written submissions and on the criteria as laid out in this document. A short-list of contractors will be selected and notified for further discussion within one week of proposal submission closing date. Contractors who are not shortlisted will be informed in writing.

4.4 Site Visits to Reference Projects

Short listed contractors will be required to show one of their reference projects of similar size as a means to demonstrate their work practices. Attendees of the site visit will be appointed representatives of RGHS.

4.5 Presentation to RGHS School Governing Body (SGB) for Approval

Based on the written submissions and site visits, a report with recommendations will be compiled by the appointed RGHS representative. The report will be presented to the RGHS SGB for consideration and approval.

4.6 Contract Award

The RGHS SGB will make the final decision on whether to proceed with this project and with which contractor. The successful contractor will be contacted to plan for the start of installation. Unsuccessful contractors will be informed in writing.

5 Project Schedule

The following table shows the expected programme schedule for the approval and execution of this project, which will commence when the tender goes out.

Activity	Date
Tender is open, including 1 week for site visit (by appointment only)	**6 to 24 February 2023**
Evaluation of proposals and selection of successful tender	**2 weeks**
Drafting of contract	**2 weeks**
Ordering of materials	**2 – 3 months**
Construction and installation	**3 months**
Commissioning, performance testing and final handover	**1 – 2 months**

6 System Sizing and Design

The following table lists the basic system requirements to be considered.

System Type	Grid-tied (non-residential SSEG)
Installation Type	**Fixed Rooftop (multiple roofs) and carport installation**
PV Generation Capacity (AC)	**Minimum 157 kWp**
Battery Backup Systems	**See 7.1 below for BESS requirements**
Location	**Rustenburg Girls' High School, Rondebosch**
Supply Utility	**City of Cape Town**
Existing Tariff	**Small Power User 1 High Consumption**

Proposed New Tariff	**Non-Residential SSEG**
Existing Annual Consumption	**500,000 kWh**
Utility Circuit Breaker Size (3ph)	**630A – dedicated transformer**

7 Technical Requirements

7.1 The table below provides an overview of the technical specifications of the systems to be provided:

ITEM		**DESCRIPTION**	
Solar PV System	AC Coupled	157	kWp
	DC Coupled	-	kWp
	Total	157	kWp
Battery Energy Storage System (BESS)	Total Capacity	400	kWh
	Depth of Discharge	80	%
	Useable Capacity	320	kWh
Inverter Capacity	Grid-tied Solar PV	2 x 36; 1 x 60	kW
	Battery only (BESS)	2 x 100	kW
	Hybrid (Solar PV + BESS)	-	kW
Annual Energy Yield	(P50)	237.3	MWh
Performance Ratio	(P50)	80.4	%
Carbon Offset	(Annually)	238.5	tonnes
Solar PV Location	Carports | Prefab Roof | Swimming Pool Pergola | Ground Mount		
BESS Location	Existing main incomer / Minisub area		
Possible Additional Works Required	*Internal load management through programmable relays*		

7.2 Applicable Standards

This project falls within the authority of City of Cape Town municipality. The system must be designed and installed according to the City of Cape Town's "**REQUIREMENTS FOR SMALL-SCALE EMBEDDED GENERATION"**, which is available on their website. This document stipulates all significant requirements and references the applicable national and international standards.

NRS 097-2-1: 2017 is the applicable national standard.

7.3 Modular Design

It is expected that the RGHS may wish to expand the capacity of this system in future. All proposals must take this into consideration and provide for a modular approach to the design of the system.

7.4 PV Panel Selection

PV panels using Mono-Crystalline Silicon with a 30-year performance warranty will be the preferred choice for this project. Panels which have been designed to eliminate PID as well as frame and mount structure corrosion will also be given preference. Panels being proposed must be certified as compliant with **IEC 61215: 2016**.

7.5 PV Installation Considerations

All DC cabling shall be protected by means of UV stabilized conduit (not exposed to direct sunlight) or stainless-steel/galvanized steel piping where it is exposed to the sun or potential physical damage. This includes on the roof, under the PV panels, as well as the cable routes between the PV panels and the inverter/s. All DC cabling passing through roof spaces, where exposed wood trusses are located, will be routed through stainless-steel/galvanized steel piping to further reduce the risk of fire in these vulnerable spaces. Contractors may propose a means of protecting the DC cables which is equivalent or better. Loose or unprotected DC cables will not be accepted anywhere on this project.

A shading analysis should be provided to demonstrate that there will be no adverse effects due to shading (between 07h00 and 17h00 during the summer and 09h00 and 15h00 during winter).

7.6 Electrical Installation

Only material approved for use in South Africa will be allowed. This includes circuit breakers, fuses, fuse holders, DC isolators, wiring and cabling etc. All equipment must meet or exceed the SABS standards for use within South Africa. The onus will be on the contractor to prove that such equipment is compliant by means of appropriate test certificates provided by reputable, independent test and certification authorities.

7.7 Power Optimisation

The Solar system shall include maximum power point tracking (MPPT) to ensure that the PV panels are optimally utilised. All panels in any given array/string must be mounted with the same inclination and orientation.

7.8 Inverters and/or Batteries

Where relevant, only inverters and equipment listed on the City of Cape Town website may be used for this project.

Moreover, the installation needs to comply with all technical requirements as per **NRS 097-2-1: 2017**.

7.9 Utility Connection

The contractor, once appointed, will be expected to liaise with the City of Cape Town and complete all necessary forms. An ECSA-registered professional engineer will be required to sign off upon completion of commissioning to enable final registration with and approval by City of Cape Town.

7.10 Performance Monitoring System

System monitoring via the manufacturer's portal (or alternative) is required giving access to graphs and displays for public viewing as well as regular reporting (monthly, annual).

8 Proposal Format

8.1 Cover Page

Each proposal must have a cover page which includes the following information:

Project Name	**Rustenburg Girls' High School Solar Project**
Organisation name	
Primary address	
Contact person: **Name** **Phone Number** **Email**	

8.2 Company Background and Qualifications

8.2.1 Track Record

- Track record within the City of Cape Town for Small Scale Embedded Generation (SSEG):
- Company history and registration details.
- Reference list of other similar installations in City of Cape Town or Western Cape surrounds.
- 2 recent projects (<5yrs) indicating name, system installed capacity, system performance vs design/expected performance since new, PV Panel Technology used.
- 2 older projects (>5yrs) indicating name, system installed capacity, system performance vs design/expected performance since new, PV Panel Technology used. All reference projects must be independently verifiable.

8.2.2 Local Inhouse Capability

Local presence and in-house qualifications for:

- Site analysis, including:
    - load profile measurement,
    - shading analysis and
    - orientation optimisation

- System design
- Installation using qualified staff, trained to the relevant local/international standards and best practices
- Applicable Health and Safety training
- Commissioning and professional sign-off
- System performance monitoring
- Annual maintenance and warranty handling

8.3 Compliance to Technical Requirements

The contractor shall provide detailed descriptions with photographs (from their own projects) and other supporting documents showing how they intend to comply with the technical requirements listed in section 7 above.

This will include, but not be limited to the following items:

- Details of site survey and proposed roof location for installation and orientation of the solar panels
- Specifications of the solar panel, inverters, and all other accessories. The specifications should include make, model, country of manufacture and warranty period. Supporting certificates and data sheets must be provided.
- Preference will be given to Tier 1 suppliers.
- Mounting type with specific reference to the roofing installed at RGHS. Protection of system from animals and birds where applicable.
- Frame and mounting system corrosion mitigation methodology.
- DC cable management.
- Load profile measurements and analysis is available and attached for reference purposes.

8.4 System Proposal and Performance

Energy simulations with AC kWh output after accounting for panel efficiency corrected for local conditions, inverter efficiency, wiring losses and other losses. Local conditions to be accounted for include, expected operating cell temperature, irradiance levels, etc.

- Over the performance warranty period of the solar panels
- on a monthly basis for first year
- on a monthly basis for the 10th year
- on a monthly basis at the end of the performance warranty period for the solar panel

PV Panel performance degradation factor (% reduction per annum)

Specific production (kWh/kWp/Year)

- Over the performance warranty of the solar panel (Average)
- For the first year
- For the 10th year

Expected “Self-Consumption” ratio (% Self Consumption) for each month. This can be done with the aid of measured load profile data or the data as provided in this RFP.

Performance guarantee of the system. The kWh generated and period for which this guarantee is applicable should be stated clearly.

Single line diagrams of the current electrical system are available on request for perusal by the short-listed contractors.

8.5 System Cost Proposal

The following information regarding the system cost is to be provided.

- Total Capital Cost (Including VAT)
- Bill of materials with component costs and labour costs.
- Outsourced costs
- Estimated costs for CoCT requirements (as applicable)
- Maintenance cost per annum (as proposed by the contractor). This can be based on % of capital value. It will be assumed that this cost will increase at CPI annually.

8.6 Energy Savings

Evaluation of proposals will be based on energy (kWh) savings viewed per year over the life of the system. This is made up of two components:

- Self-consumption of PV-generated energy and
- PV-generated energy exported to the utility.

While the contractor is free to translate this into "rand-savings", all proposals will be evaluated using the same economic assumptions, such as electricity price escalation, inflation and interest.

8.7 Input Data

8.7.1 Electricity Consumption

For this proposal, the RGHS's approx. monthly electricity consumption is shown in the table below. This can be split approx. 60:40 between day and night consumption:

8.7.2 Load Profile

The load can be assumed to be constant for night-time and relatively flat (constant) for day- time between 07h30 and 15h00.

The load profile has already been measured and verified by means of the 30-min metering data from City of Cape Town and direct measurements.

8.8 Risks During Construction

This project is for a high school which comes with significant inherent public safety risks. The contractor is required to demonstrate that they have a full appreciation for what it takes to mitigate all risks associated with this type of site.

8.8.1 Risks the Client should know about.

The contractor needs to state upfront what it requires to enable a safe work environment, such as lay-down areas, access control (out of bounds areas), space for cranes or scaffolding and buildings being worked on to be vacant or not. Installation during a school holiday when there are fewer people on site, will be preferred.

8.8.2 Hazard Identification and Risk Mitigation Plan.

The contractor is expected to provide a baseline (generic) Risk Assessment, as an example, to demonstrate that they understand the risks associated with installing PV systems in public spaces. Once the contractor is appointed, they will need to provide a site-specific Risk Assessment for this project before they may proceed with work on site.

8.9 System Performance Guarantee and Retention

The decision to invest in Solar PV is based largely on expected yields and energy savings and hence financial savings. This means that there needs to be a performance guarantee upon which this investment decision can be based.

An amount of **10%** of contract value (Incl. VAT) will be held back until the RGHS is satisfied that the system will deliver according to the proposed yield values.

It is understood that solar irradiance conditions vary with weather and climatic variations. It is thus not possible to guarantee an exact yield in any given year. It is, however, possible to select a number of days where irradiance and other conditions are known, where the system's output can be measured against the design expectation.

The contractor shall propose a schedule of calibrated measurements, over a period not exceeding three months, to demonstrate that the system produces the promised energy savings.

9 Tender Evaluation

This RFP will be evaluated according to the following criteria:

9.1 Contractor Qualifications (including level of BBBEE Compliance) – 15% *(as per section 3 above)*

9.2 Technical Requirements – 10% *(as per section 7 above)*

9.3 Proposal Format – 75%

- Company background and qualifications – 5%
- Compliance to technical requirements – 5%
- System proposal and performance – 20%
- Cost proposal – 40%
- System performance, guarantee and retention – 5%

10 Appendices – Reference Documents

10.1 Appendix 1: Billing

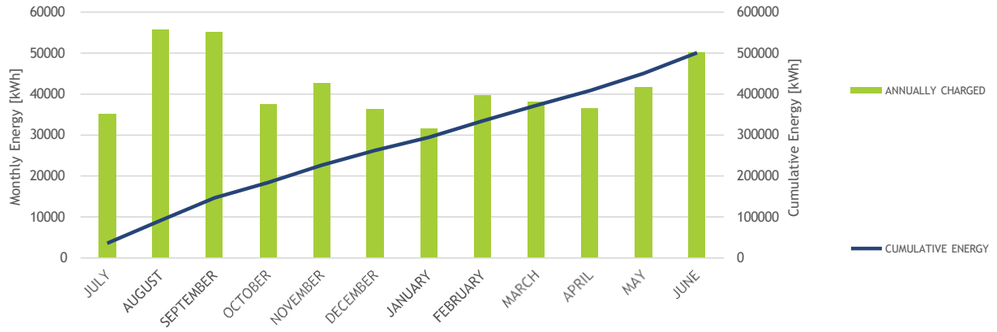
10.2 Appendix 2: Combined Load Profile

10.3 Appendix 3: Comparison to Billing Data

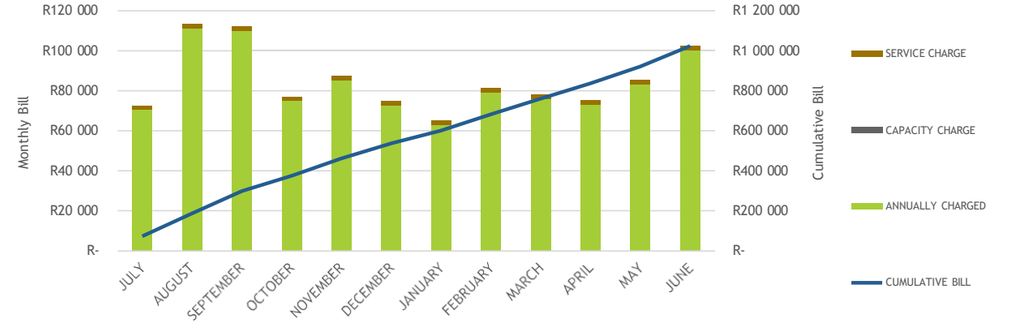
APPENDIX 1: BILLING

ELECTRICITY BILLING DETAILS			
Supply Authority Type		MUNICIPAL	
Municipality (if applicable)		City Of Cape Town	
Tariff Structure		Small Power User High	
Financial Year		2021/22	
ENERGY CHARGES			
Billing Type		Low	High
Annual Rate	c/kWh	199.48	
Seasonal Rate	c/kWh		
Time-Of-Use			
Peak	c/kWh		
Standard	c/kWh		
Off-Peak	c/kWh		
Demand Charges	R/kVA		
Reactive Energy Charge	c/kVARh		
Capacity Charge	R/month		
Service Charge	R/month	R2 098.80	

MONTHLY ENERGY CONSUMPTION



MONTHLY UTILITY BILLS



MONTH	TOU			SEASONALLY CHARGED		ANNUALLY CHARGED	DEMAND	REACTIVE ENERGY		TOTAL ENERGY	CUMULATIVE ENERGY
	PEAK	STANDARD	OFF-PEAK	LOW SEASON	HIGH SEASON						
	kWh	kWh	kWh	kWh	kWh	kWh	kVA	kVARh		kWh	kWh
JULY						35 247.0				35 247.0	35 247.0
AUGUST						55 789.0				55 789.0	91 036.0
SEPTEMBER						55 085.0				55 085.0	146 121.0
OCTOBER						37 466.0				37 466.0	183 587.0
NOVEMBER						42 637.0				42 637.0	226 224.0
DECEMBER						36 312.0				36 312.0	262 536.0
JANUARY						31 501.0				31 501.0	294 037.0
FEBRUARY						39 662.0				39 662.0	333 699.0
MARCH						38 144.0				38 144.0	371 843.0
APRIL						36 625.0				36 625.0	408 468.0
MAY						41 675.0				41 675.0	450 143.0
JUNE						50 254.0				50 254.0	500 397.0
TOTAL	-	-	-	-	-	**500 397.0**	-	-		**500 397.0**	

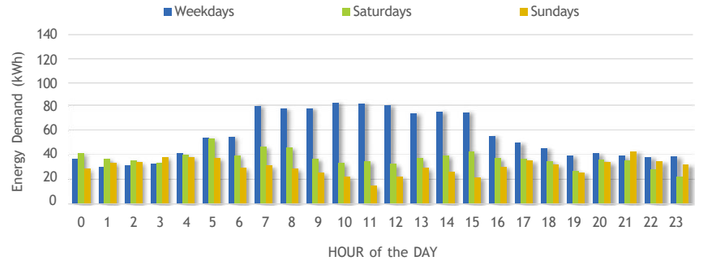
MONTH	TOU			SEASONALLY CHARGED		ANNUALLY CHARGED	DEMAND CHARGE	REACTIVE ENERGY CHARGE	CAPACITY CHARGE	SERVICE CHARGE	TOTAL BILL	CUMULATIVE BILL
	PEAK	STANDARD	OFF-PEAK	LOW SEASON	HIGH SEASON							
	R	R	R	R	R	R	R	R	R	R	R	R
JULY						R 70 310.72			R -	R 2 098.80	R 72 409.52	R 72 409.52
AUGUST						R 111 287.90			R -	R 2 098.80	R 113 386.70	R 185 796.21
SEPTEMBER						R 109 883.56			R -	R 2 098.80	R 111 982.36	R 297 778.57
OCTOBER						R 74 737.18			R -	R 2 098.80	R 76 835.98	R 374 614.55
NOVEMBER						R 85 052.29			R -	R 2 098.80	R 87 151.09	R 461 765.64
DECEMBER						R 72 435.18			R -	R 2 098.80	R 74 533.98	R 536 299.61
JANUARY						R 62 838.19			R -	R 2 098.80	R 64 936.99	R 601 236.61
FEBRUARY						R 79 117.76			R -	R 2 098.80	R 81 216.56	R 682 453.17
MARCH						R 76 089.65			R -	R 2 098.80	R 78 188.45	R 760 641.62
APRIL						R 73 059.55			R -	R 2 098.80	R 75 158.35	R 835 799.97
MAY						R 83 133.29			R -	R 2 098.80	R 85 232.09	R 921 032.06
JUNE						R 100 246.68			R -	R 2 098.80	R 102 345.48	R 1 023 377.54
TOTAL	R -	R -	R -	R -	R -	**R 998 191.94**	R -	R -	R -	**R 25 185.60**	**R 1 023 377.54**	

APPENDIX 2: COMBINED LOAD PROFILE

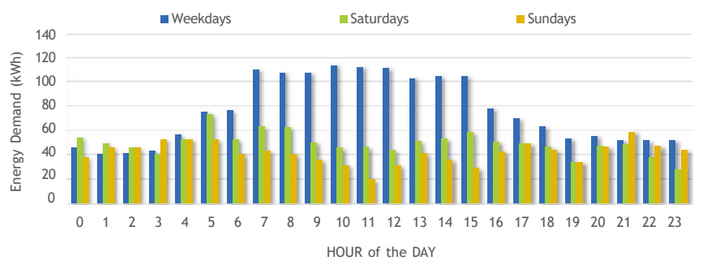
ANNUAL LOAD PROFILE MODELLING	
PROJECT NAME	RGHS - COMBINED LOAD PROFILE
PROJECT LOCATION	CAPE TOWN | WESTERN CAPE

ANNUAL PROFILE SUMMARY	MUNICIPAL SUPPLY

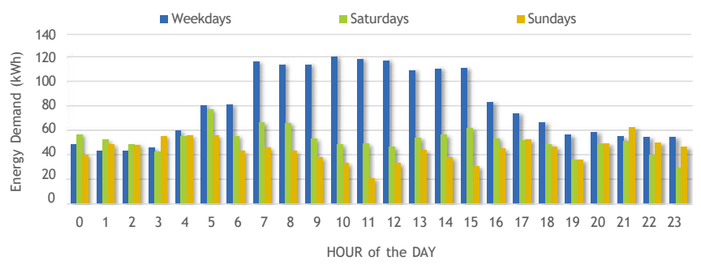
MONTH 1 — JULY



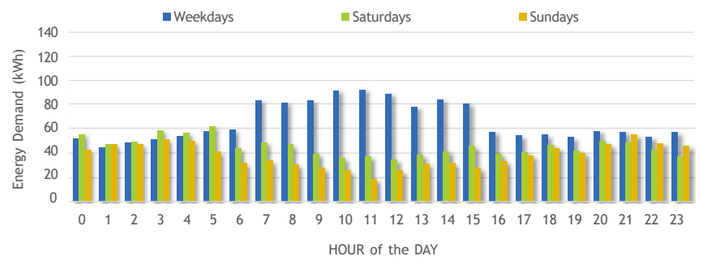
MONTH 2 — AUGUST



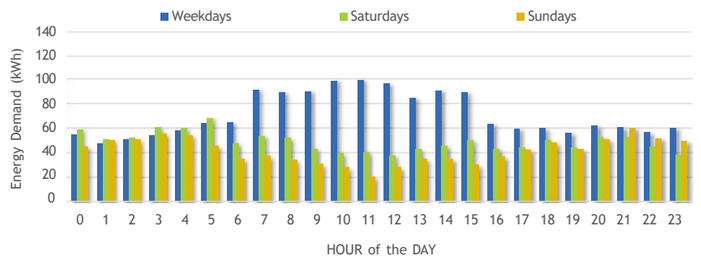
MONTH 3 — SEPTEMBER



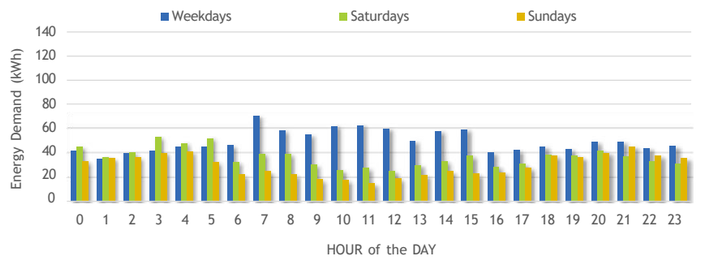
MONTH 4 — OCTOBER



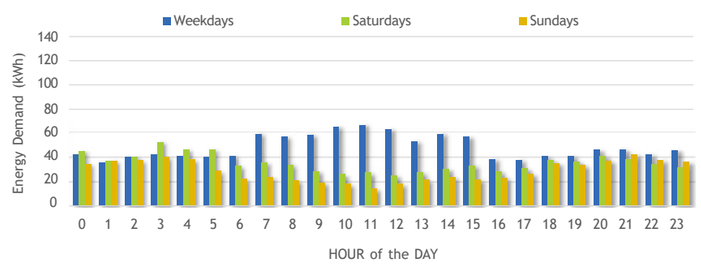
MONTH 5 — NOVEMBER



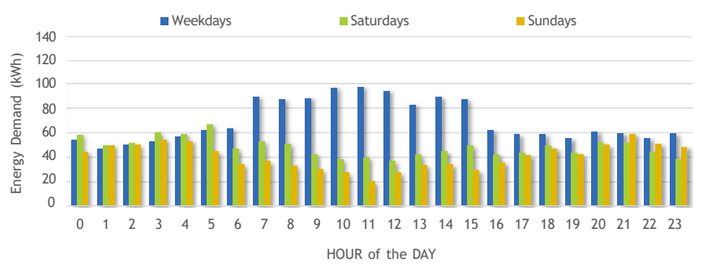
MONTH 6 — DECEMBER



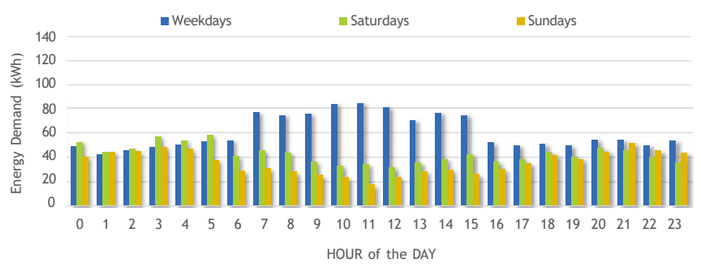
MONTH 7 — JANUARY



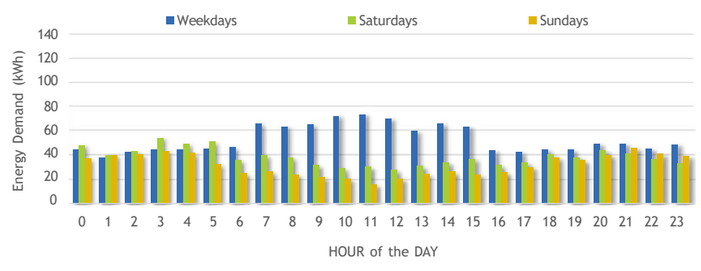
MONTH 8 — FEBRUARY



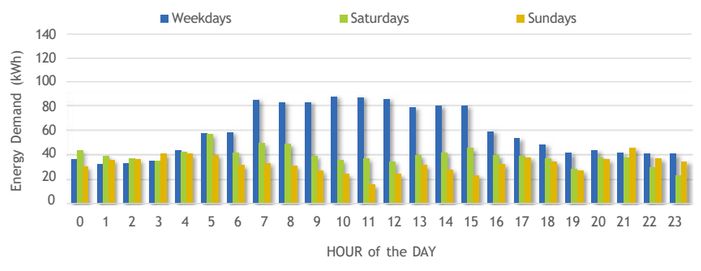
MONTH 9 — MARCH



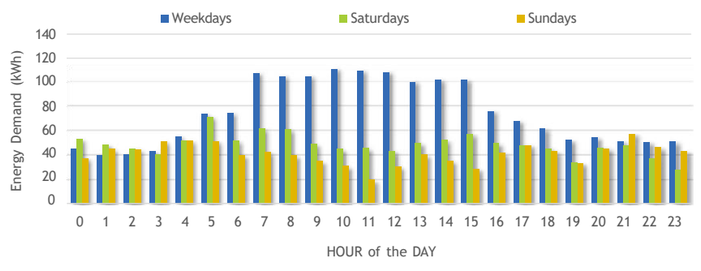
MONTH 10 — APRIL



MONTH 11 — MAY



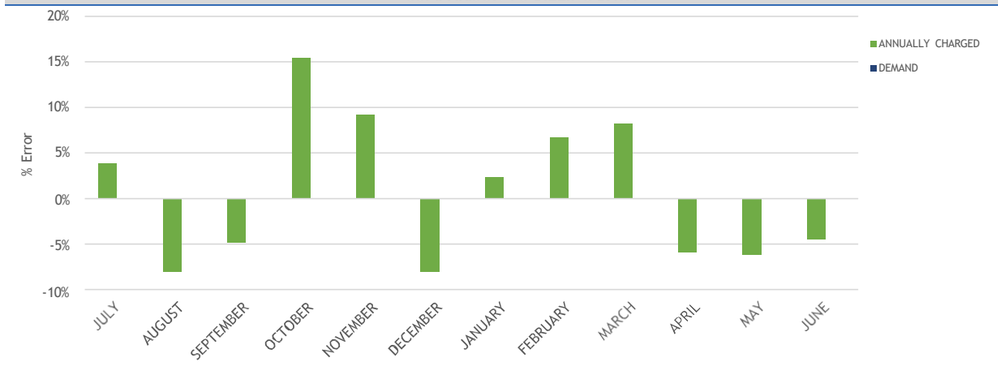
MONTH 12 — JUNE



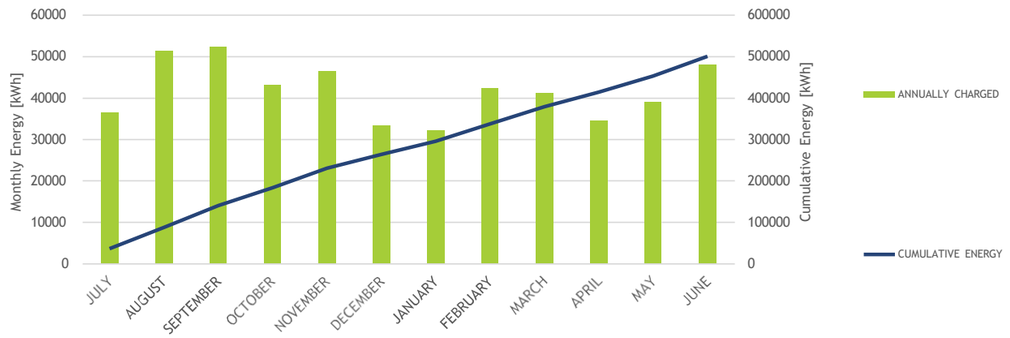
APPENDIX 3: COMPARISON TO BILLING DATA

SIMULATED PROFILE UTILITY BILLS 2019 RATES			
Supply Authority Type		MUNICIPAL	
Municipality (if applicable)		City Of Cape Town	
Tariff Structure		Small Power User High	
ENERGY CHARGES			
Billing Type		Annualy	
		Low	High
Annual Rate	c/kWh	199.48	
Seasonal Rate	c/kWh		
Time-Of-Use			
Peak	c/kWh		
Standard	c/kWh		
Off-Peak	c/kWh		
Demand Charges	R/kVA		
Reactive Energy Charge	c/kVARh		
Capacity Charge	R/month		
Service Charge	R/month	R2 098.80	

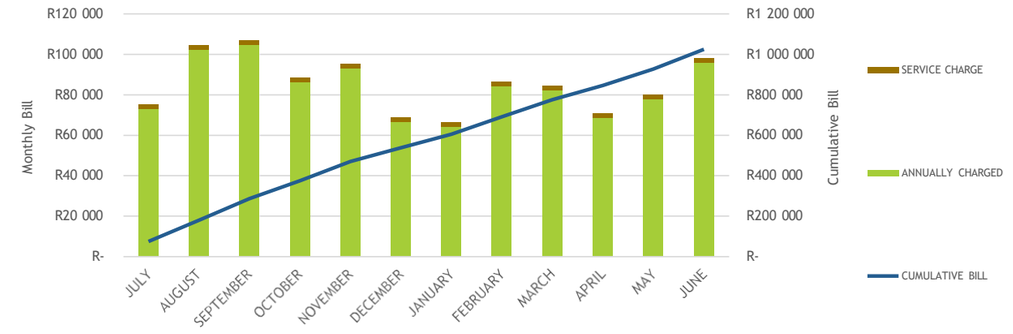
COMPARISON TO BILLING DATA



MONTHLY ENERGY CONSUMPTION



MONTHLY UTILITY BILLS



MONTH	TOU			SEASONALLY CHARGED		ANNUALLY CHARGED	DEMAND	REACTIVE ENERGY		TOTAL ENERGY	CUMULATIVE ENERGY
	PEAK	STANDARD	OFF-PEAK	LOW SEASON	HIGH SEASON						
	kWh	kWh	kWh	kWh	kWh	kWh	kVA	kVARh		kWh	kWh
JULY						36 585.3	86.5	9 833.0		36 585.3	36 585.3
AUGUST						51 316.4	118.5	13 792.2		51 316.4	87 901.7
SEPTEMBER						52 409.0	125.6	14 085.9		52 409.0	140 310.7
OCTOBER						43 233.7	125.0	11 619.8		43 233.7	183 544.4
NOVEMBER						46 552.4	103.7	12 511.8		46 552.4	230 096.8
DECEMBER						33 392.2	72.9	8 974.8		33 392.2	263 489.1
JANUARY						32 243.8	69.4	8 666.1		32 243.8	295 732.8
FEBRUARY						42 301.5	101.7	11 369.3		42 301.5	338 034.3
MARCH						41 257.6	87.9	11 088.7		41 257.6	379 291.9
APRIL						34 441.1	76.3	9 256.7		34 441.1	413 733.0
MAY						39 085.7	91.5	10 505.0		39 085.7	452 818.8
JUNE						48 001.1	115.0	12 901.2		48 001.1	500 819.8
TOTAL	**-**	**-**	**-**	**-**	**-**	**500 819.8**		**134 604.4**		**500 819.8**	

MONTH	TOU			SEASONALLY CHARGED		ANNUALLY CHARGED	DEMAND	REACTIVE ENERGY	CAPACITY CHARGE	SERVICE CHARGE	TOTAL BILL	CUMULATIVE BILL
	PEAK	STANDARD	OFF-PEAK	LOW SEASON	HIGH SEASON							
	R	R	R	R	R	R	R	R	R	R	R	R
JULY						R 72 980.34	R -	R -	R -	R 2 098.80	R 75 079.14	R 75 079.14
AUGUST						R 102 365.98	R -	R -	R -	R 2 098.80	R 104 464.78	R 179 543.92
SEPTEMBER						R 104 545.50	R -	R -	R -	R 2 098.80	R 106 644.30	R 286 188.23
OCTOBER						R 86 242.54	R -	R -	R -	R 2 098.80	R 88 341.34	R 374 529.57
NOVEMBER						R 92 862.76	R -	R -	R -	R 2 098.80	R 94 961.56	R 469 491.13
DECEMBER						R 66 610.84	R -	R -	R -	R 2 098.80	R 68 709.64	R 538 200.77
JANUARY						R 64 319.89	R -	R -	R -	R 2 098.80	R 66 418.69	R 604 619.46
FEBRUARY						R 84 382.93	R -	R -	R -	R 2 098.80	R 86 481.73	R 691 101.20
MARCH						R 82 300.73	R -	R -	R -	R 2 098.80	R 84 399.53	R 775 500.73
APRIL						R 68 703.08	R -	R -	R -	R 2 098.80	R 70 801.88	R 846 302.61
MAY						R 77 968.25	R -	R -	R -	R 2 098.80	R 80 067.05	R 926 369.66
JUNE						R 95 752.55	R -	R -	R -	R 2 098.80	R 97 851.35	R 1 024 221.01
TOTAL	**R -**	**R -**	**R -**	**R -**	**R -**	**R 999 035.41**	**R -**	**R -**	**R -**	**R 25 185.60**	**R 1 024 221.01**	