Appendix A : Power system report

A.1 Reference consumption calculation

Communication Report – Power System Status

Report number: 2639 Evening	**Date:** 17 September 2013 **Time:** 16h45	
Evening Peak 16 Sep	31 896 MW	
System Demand	29 926 MW	
☐ **Generation Status- Morning**	**Currently Available Generation**	31 120 MW
	Forecast Morning Peak Generation	30 005 MW
	Operating Reserve for Morning Peak	1 115 MW
	Usage of Reserves	**Emergency Level 1 –** Available **Demand Market Participation-** Available **Peaking Gas Turbines(Port Rex and Acacia) –** Available **Peaking Gas Turbines(Ankerlig and Gourikwa) -** Available **Interruptibles –** Available **Planned Load shedding -** None
☑ **Generation Status- Evening** **Prognosis for later today**	**Expected Available Generation**	29 388 MW
	Forecast Evening Peak	32 318 MW
	Operating Reserve for Evening Peak-	-2 930 MW ★
	Usage of Reserves	**Emergency Level 1 –** Utilised **Demand Market Participation -** Utilised **Peaking Gas Turbines (Port Rex and Acacia) –** Utilised **Peaking Gas Turbines (Ankerlig and Gourikwa) -** Utilised **Interruptibles –** Partially Utilised **Planned Load Shedding –** None

General:
1. The term "Available" means Usage of Reserves denotes supply options that can be utilised if demand outstrips supply. When these supply options are used to satisfy demand, then "Available" will change to "Partially Utilised" or "Utilised.
2. The Operating Reserve does not include Emergengy Reserves so that a true picture is presented. When the Operating reserve is below 800 MW, the displayed figure will be followed by a red star.
3. Plannned Load Shedding is part of the Power Rationing Phase.

Figure A.1: Power system report sent out from Eskom to all the large consumers.

Appendix B : ECS rules summary

B.1 Reference consumption calculation

To create a realistic representation, the costumer and the licensee must analyse the hourly electricity consumed over three alternative periods for the related reference consumption as described below:

Reference period

Period A: A period of twelve consecutive months (12 billing periods) determined by reviewing all of the billing periods between 16 October 2006 and 15 July 2011 and selecting one billing period for each month of the year from which the highest average daily consumption was recorded.

Period B: A period of twelve consecutive months (12 billing periods) with measurement dates between 16 December 2002 and 15 July 2011 for which the highest cumulative average daily consumption was recorded.

Period C: A period of twelve consecutive months commencing on the first day of the October 2006 billing period and ending on the last day of the September 2007 billing period.

Reference consumption

Reference consumption A: The customer's reference consumption shall be equal to 97.5% of the sum of the total electricity consumption for the billing periods of Period A, or such amount annualised, if applicable.

Reference consumption B: The customer's reference consumption shall be equal to the total electricity consumption of the customer, during Period B, up to a maximum amount of 107.5% of the reference consumption A, or such amount annualised.

Reference consumption C: The customer's reference consumption shall be equal to the total electricity consumption of the customer during Period C, or such amount annualised, if applicable.

The dates related to the mentioned periods correspond to the ECS consultation draft of 2011. It is assumed that if the ECS procedure is approved, these dates would change accordingly. The electricity consumed during the three periods described would then be used in the reference consumption calculation. Different models and rules shall apply to the adjustment of reference consumption A, B and C. Throughout the process of calculating and choosing the applicable reference consumption the licensee should be involved and agree on the calculation values and methods.

If the duration of the reference period is not equal to 365 days the reference consumption

shall be annualised by dividing the total electrical energy calculated for the reference period by the relevant days in the reference periods and multiplying it by 365. In the case where the customer would like to increase or decrease the reference consumption due to misrepresentation, the customer must be able to justify that the upward or downward adjustment will be needed in the case of future consumption.

The customer and the licensee must then agree on the change, there must be transparencies and the customer must be able to clearly motivate the need for adjustment. For the purpose of the research and simulations, it was assumed that no adjustments were needed and that all the received measured data is a suitable representation of the customer's electrical consumption.

B.2 Allocation management

An ECS customer may belong to one customer group while being associated to one another, having common shareholders and registered on the allocation management system. Each customer will have a daily electricity balance allocated by phasing or rephasing plus any Right To Consume (RTC) allocations provided by any other members of the customer group. Phasing gives the customer the ability to assign portions of the annual electricity allocations to certain days or portions of the year as they manage their electricity balance. Rephasing changes the daily allocated values either upward or downward as the ECS year progresses, always coinciding with ECS rules, and allowing enough time for the licensee to correspond.

Ensuring optimal use of electricity is recommended, including that the ECS customer consumes at least all of the allocated electricity or at least a substantial portion. The ECS customer can ensure this by either making use of phasing or disposing of excess electricity with RTCs realising the maximum benefits of the allocation management system. Additionally the customer can consume more than the specified daily electricity allocation in any billing period, but not more than the monthly electricity allocation without making use of late allocations.

Appendix C : Eskom Megaflex rates

C.1 Monthly electricity charges

Network charges for Megaflex customers are illustrated in Table C.1 [1]. Each cost item can be described as:

Charge	Unit
Active energy charge	c/kWh
Electrification and rural subsidy	c/kWh
Reactive energy charge	c/kVArh
Transmission network charges	R/kVA/m
Distribution network charges	
Network access charge	R/kVA/m
Network demand charge	R/kVA/m
Service charge	R/Account/day
Administration charge	R/POD/day
Environmental levy charge	c/kWh

key:

m = month
R = RSA Rand
c = RSA cent
POD = Point Of Delivery

Table C.1: Eskom monthly charges breakdown [1].

- Active energy charge (c/kWh): Seasonally dependent and time of use differentiated, based on the voltage of supply and the transmission zone.
- Transmission network charge (R/kVA/month): Based on the voltage of the supply, the transmission zone and the utilised capacity applicable during all time periods.
- Distribution network access charge (R/kVA/month): Based on the voltage of the supply and the utilised capacity applicable during all time periods.
- Distribution network demand charge (R/kVA/month): Based on the voltage of the supply and the chargeable demand applicable during peak periods only.
- Electrification and rural subsidy (c/kWh): Contribution to cross-subsidies to Rural and Homelight tariffs, applied to the total active energy supplied in the month.
- Environmental levy charge (c/kWh): Applied to the total active energy supplied in the month.
- Service charge (R/day): Based on the monthly utilised capacity of each premise linked to an account.
- Administration charge (R/day): Based on the monthly utilised capacity of each premise linked to an account.

- Reactive energy charge (c/kVArh): Charged on every kVArh (reactive energy) which is registered in excess of 30% or on a lower power factor than 0.96 of the kWh (active energy) supplied during the specified periods of the month.

MEGAFLEX **Non-Local Authority Rates**

Transmission zone	Voltage	Active energy charge (c/k/Wh)												Transmission network charges (R/kVA/mth)	
		High demand season (Jun-Aug)						Low demand season (Sep-May)							
		Peak		Standard		Off Peak		Peak		Standard		Off Peak			
		VAT excl.	VAT incl.	VAT excl.	VAT incl.	VAT excl.	VAT incl.	VAT excl.	VAT incl.	VAT excl.	VAT incl.	VAT excl.	VAT incl.	VAT excl.	VAT incl.
≤ 300km	< 500V	**188.87**	*215.31*	**49.05**	*55.92*	**26.17**	*29.83*	**52.69**	*60.07*	**32.26**	*36.78*	**22.54**	*25.70*	**R4.71**	*R5.37*
	≥ 500V & < 66kV	**182.83**	*208.43*	**47.52**	*54.17*	**25.39**	*28.94*	**51.04**	*58.19*	**31.27**	*35.65*	**21.87**	*24.93*	**R4.30**	*R4.90*
	≥ 66kV & ≤ 132kV	**176.20**	*200.87*	**45.84**	*52.26*	**24.54**	*27.98*	**49.25**	*56.15*	**30.19**	*34.42*	**21.15**	*24.11*	**R4.19**	*R4.78*
	>132kV	**170.08**	*193.89*	**44.31**	*50.51*	**23.73**	*27.05*	**47.56**	*54.22*	**29.20**	*33.29*	**20.47**	*23.34*	**R5.29**	*R6.03*
> 300km and ≤ 600km	< 500V	**190.73**	*217.43*	**49.51**	*56.44*	**26.44**	*30.14*	**53.20**	*60.65*	**32.54**	*37.10*	**22.75**	*25.94*	**R4.74**	*R5.40*
	≥ 500V & < 66kV	**184.62**	*210.47*	**47.97**	*54.69*	**25.63**	*29.22*	**51.53**	*58.74*	**31.56**	*35.98*	**22.07**	*25.16*	**R4.34**	*R4.95*
	≥ 66kV & ≤ 132kV	**177.95**	*202.86*	**46.29**	*52.77*	**24.77**	*28.24*	**49.73**	*56.69*	**30.48**	*34.75*	**21.33**	*24.32*	**R4.22**	*R4.81*
	>132kV	**171.75**	*195.80*	**44.73**	*50.99*	**23.95**	*27.30*	**48.05**	*54.78*	**29.48**	*33.61*	**20.64**	*23.53*	**R5.35**	*R6.10*
> 600km and ≤ 900km	< 500V	**192.62**	*219.59*	**50.00**	*57.00*	**26.67**	*30.40*	**53.71**	*61.23*	**32.86**	*37.46*	**22.95**	*26.16*	**R4.80**	*R5.47*
	≥ 500V & < 66kV	**186.45**	*212.55*	**48.45**	*55.23*	**25.85**	*29.47*	**52.03**	*59.31*	**31.86**	*36.32*	**22.25**	*25.37*	**R4.38**	*R4.99*
	≥ 66kV & ≤ 132kV	**179.71**	*204.87*	**46.72**	*53.26*	**24.98**	*28.48*	**50.20**	*57.23*	**30.75**	*35.06*	**21.51**	*24.52*	**R4.26**	*R4.86*
	>132kV	**173.44**	*197.72*	**45.15**	*51.47*	**24.17**	*27.55*	**48.51**	*55.30*	**29.74**	*33.90*	**20.84**	*23.76*	**R5.42**	*R6.18*
> 900km	< 500V	**194.53**	*221.76*	**50.47**	*57.54*	**26.91**	*30.68*	**54.20**	*61.79*	**33.16**	*37.80*	**23.17**	*26.41*	**R4.82**	*R5.49*
	≥ 500V & < 66kV	**188.30**	*214.66*	**48.91**	*55.76*	**26.09**	*29.74*	**52.52**	*59.87*	**32.13**	*36.63*	**22.47**	*25.62*	**R4.43**	*R5.05*
	≥ 66kV & ≤ 132kV	**181.51**	*206.92*	**47.16**	*53.76*	**25.22**	*28.75*	**50.67**	*57.76*	**31.05**	*35.40*	**21.71**	*24.75*	**R4.28**	*R4.88*
	>132kV	**175.18**	*199.71*	**45.56**	*51.94*	**24.39**	*27.80*	**48.94**	*55.79*	**30.02**	*34.22*	**21.01**	*23.95*	**R5.46**	*R6.22*

Electrification & rural subsidy (c/kWh) All Seasons		Environmental levy charge (c/kWh) All Seasons		Reactive energy charge (c/kvarh)			
				High Season		Low Season	
VAT excl.	VAT incl.	VAT excl.	VAT incl.	VAT excl.	VAT incl.	VAT excl.	VAT incl.
3.97	*4.53*	**2.00**	*2.28*	**7.56**	*8.62*	**0.00**	*0.00*

Distribution network charges				
Voltage	Network access charge (R/kVA/m)		Network demand charge (R/kVA/m)	
	VAT excl.	VAT incl.	VAT excl.	VAT incl.
< 500V	**R9.40**	*R10.72*	**R17.82**	*R20.31*
≥ 500 V & < 66 kV	**R8.63**	*R 9.84*	**R16.35**	*R18.64*
≥ 66kV & ≤ 132 kV	**R8.35**	*R 9.52*	**R15.85**	*R18.07*
>132kV	**R0.00**	*R 0.00*	**R14.28**	*R16.28*

Monthly utilised capacity	Service charge (R/Account/day)		Administration charge (R/POD/day)	
	VAT excl.	VAT incl.	VAT excl.	VAT incl.
> 1 MVA	**R 107.38**	*R 122.41*	**R48.40**	*R55.18*
Key customers	**R2,104.29**	*R2,398.89*	**R67.20**	*R76.61*

Figure C.1: Eskom Megaflex rates: 2011/2012 [1].

Appendix D : Complex power

D.1 Complex power diagram

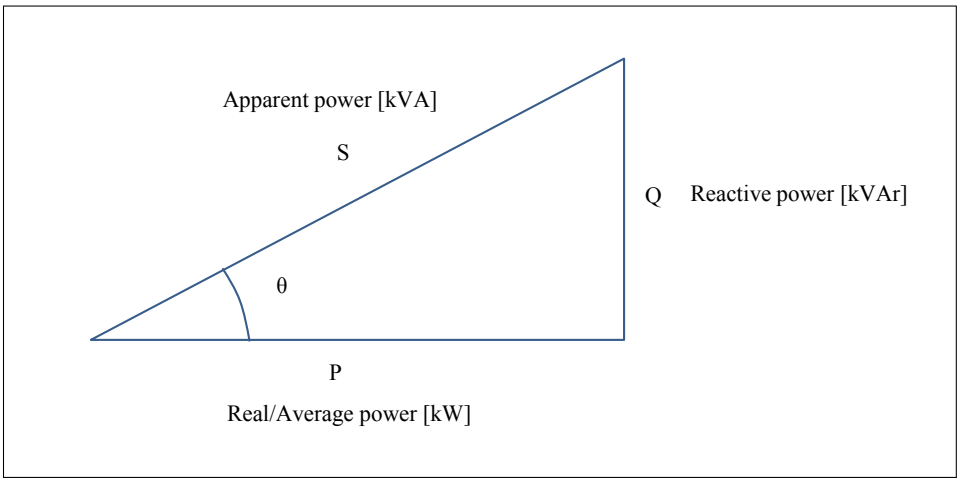


Figure D.1: Complex power diagram.

The complex power relation is provided by :

$$\overline{S} = \overline{VI} = P + \overline{j}Q \tag{D.1}$$

where the power factor (ratio between real and apparent power) is represented by:

$$pf = \cos\theta \tag{D.2}$$

$$pf = \frac{P}{S} \tag{D.3}$$

$$Q = P \times \tan\theta \tag{D.4}$$

P = Real power (kW)

S = Apparent power (kVA)

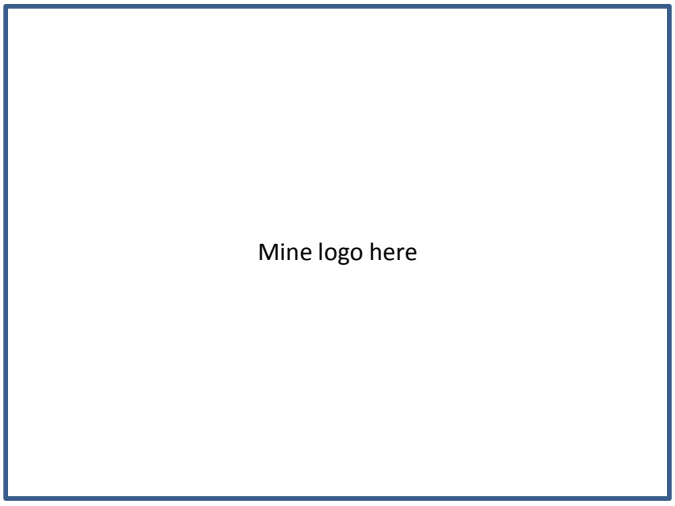
Q = Reactive power (KVar)

pf = Power factor (-)

Appendix E : Weekly electricity management reports

Electricity consumption report

Mine H



Generated on 2013-11-07

18 Jul 2013 - 17 Aug 2013

1 Summary

Table 1-1: Power consumption summary

Component	Month to date (18 Jul 2013-17 Aug 2013)	
	Actual (kWh)	Budget (kWh)
Mine H	25 050 304	24 387 976
-Compressors	7 280 893	6 805 480
-Mining	4 547 579	4 265 810
-Pumping	3 510 876	2 499 346
-Refrigeration	3 937 926	4 123 825
-Fans	4 128 886	4 310 904
-General	593 320	558 000
-Decline pumping	279 837	292 578
-Hoisting	1 412 970	1 742 696

Table 1-2: *DSM load shift performance summary (August 2013)*

Project	Impact (MW)	Target (MW)	Cost savings	Missed savings
Mine H Pumps	3.22	3.10	R 361 642	-
Mine H Fridge Plant	*			

Table 1-2: *DSM energy efficiency performance summary (August 2013)*

Project	Impact (MWh)	Target (MWh)	Cost savings	Missed savings
Mine H OAN	**			
Mine H WSO	***			

* Maintenance in progress
** In implementation
*** Under investigation

2 Section summaries

2.1 Mine H total

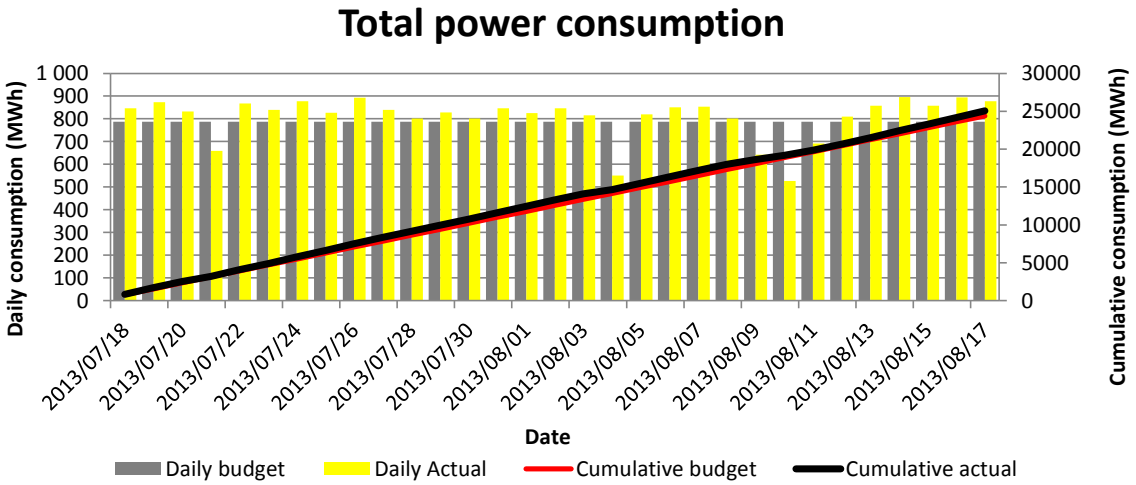


Figure 2-1: Total and daily power consumption

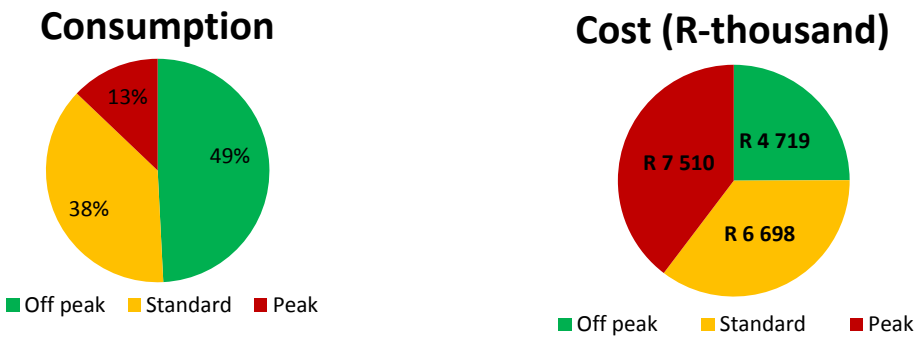


Figure 2-2: TOU performance

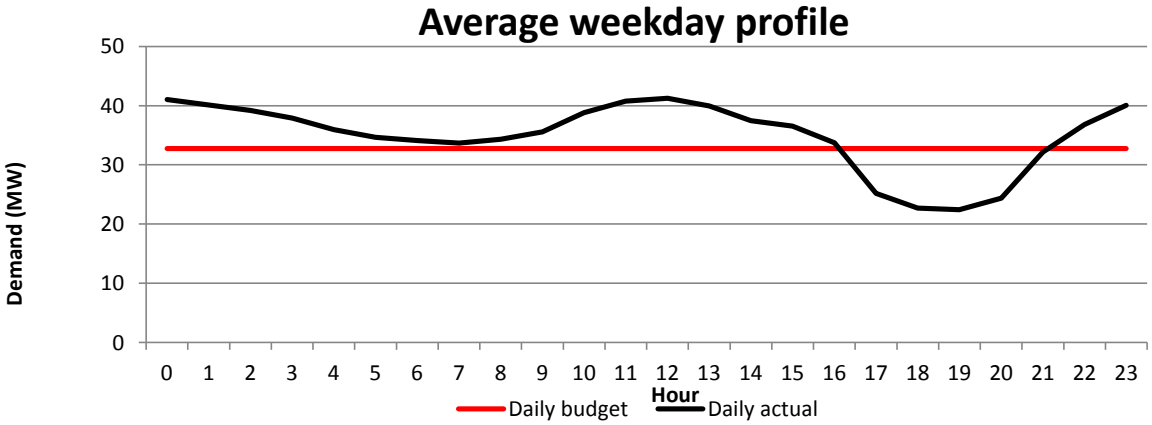


Figure 2-3: Average weekday profile

2.2 Compressors

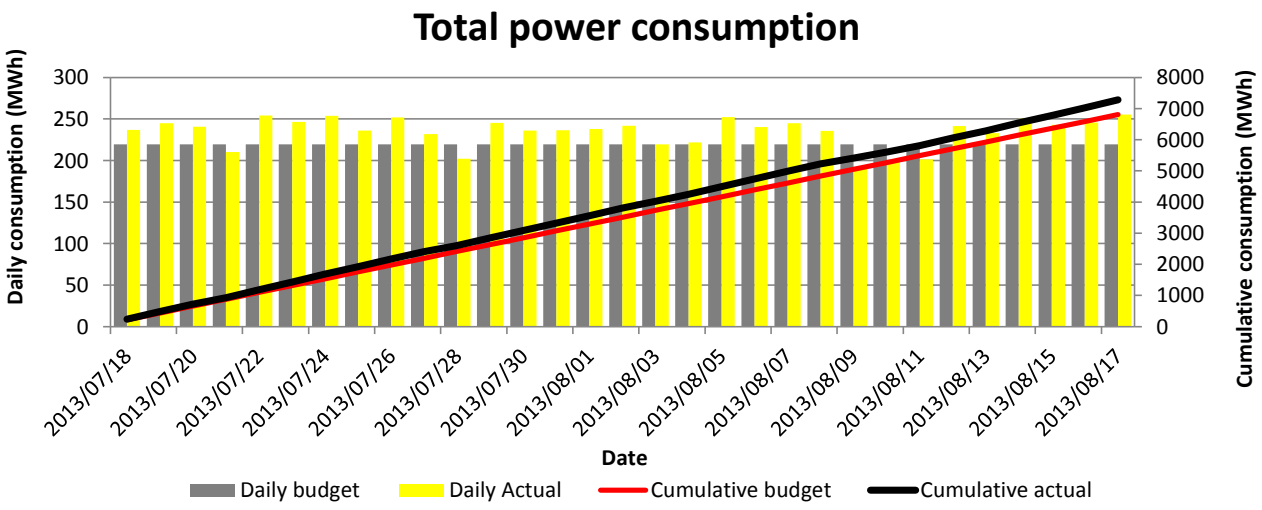


Figure 2-4: Total and daily power consumption

Figure 2-5: TOU performance

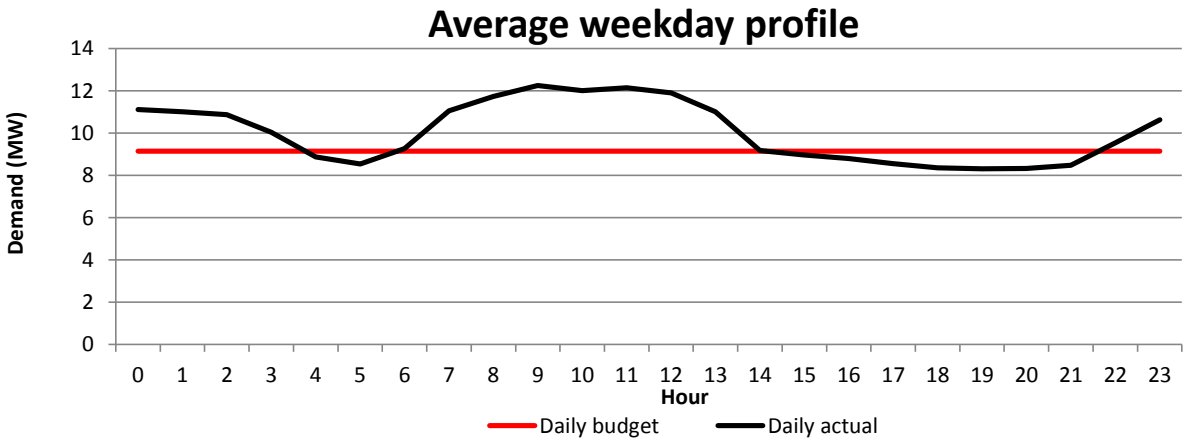


Figure 2-6: Average weekday profile

2.3 Mining

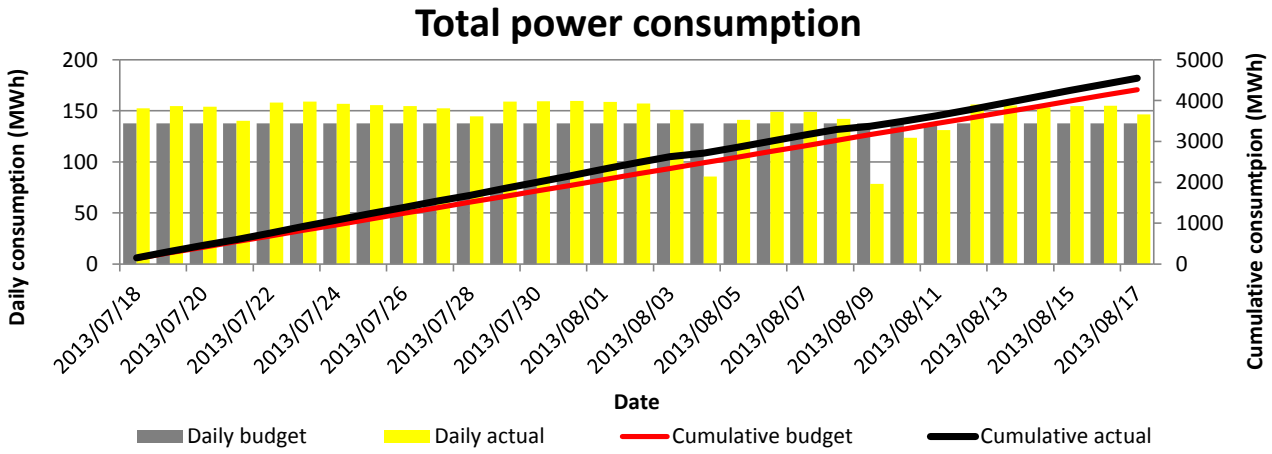


Figure 2-7: Total and daily power consumption

Figure 2-8: TOU performance

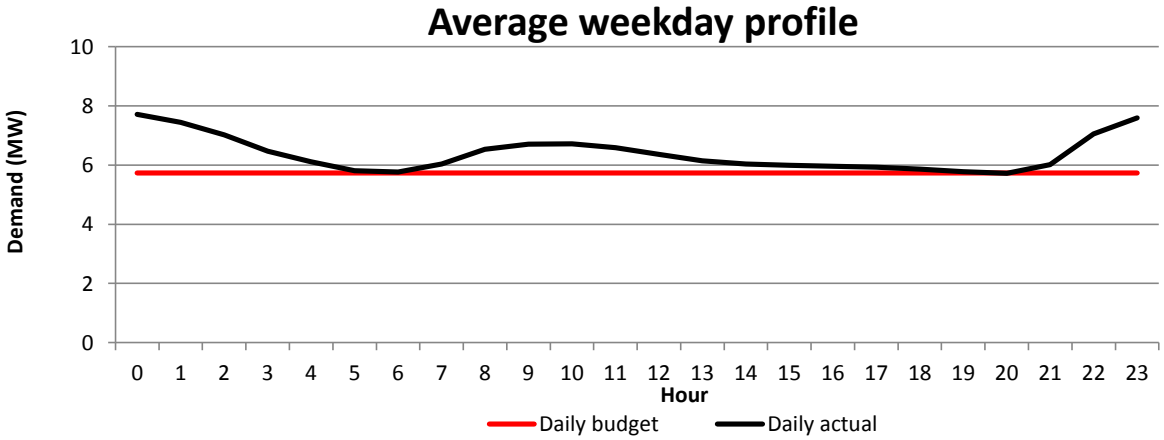


Figure 2-9: Average weekday profile

2.4 Pumping

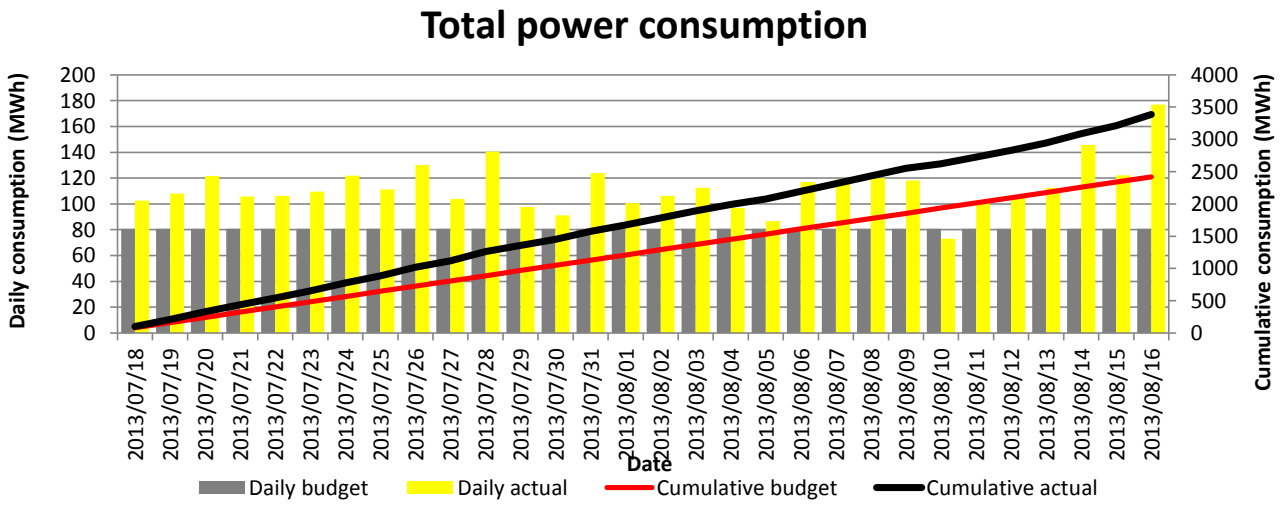


Figure 2-10: Total and daily power consumption

Figure 2-11: TOU performance

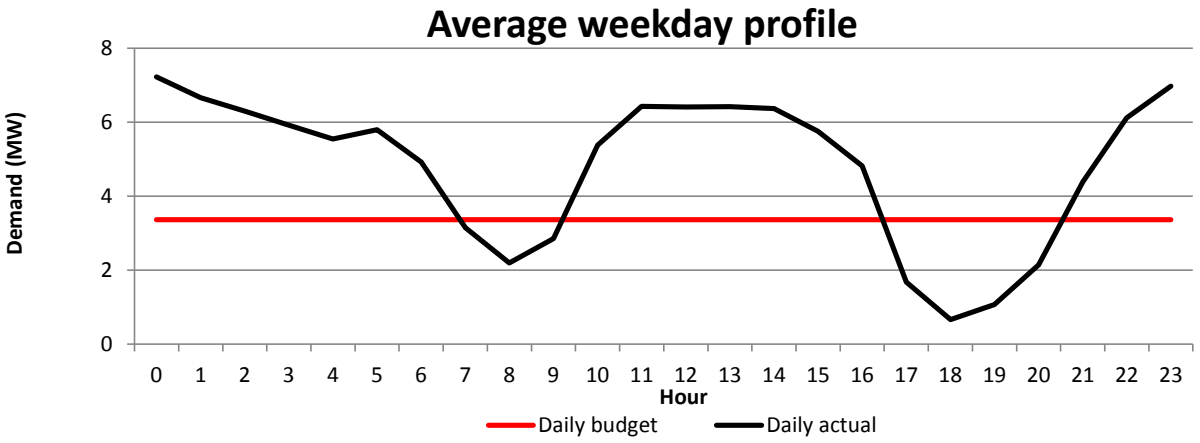


Figure 2-12: Average weekday profile

2.5 Refrigeration

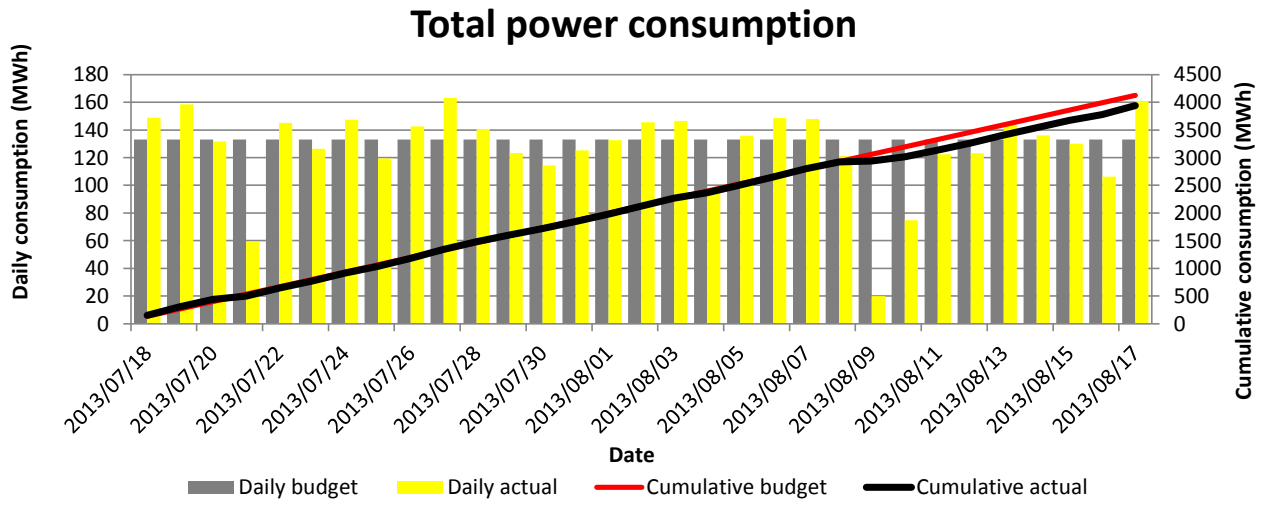


Figure 2-13: Total and daily power consumption

Figure 2-14: TOU performance

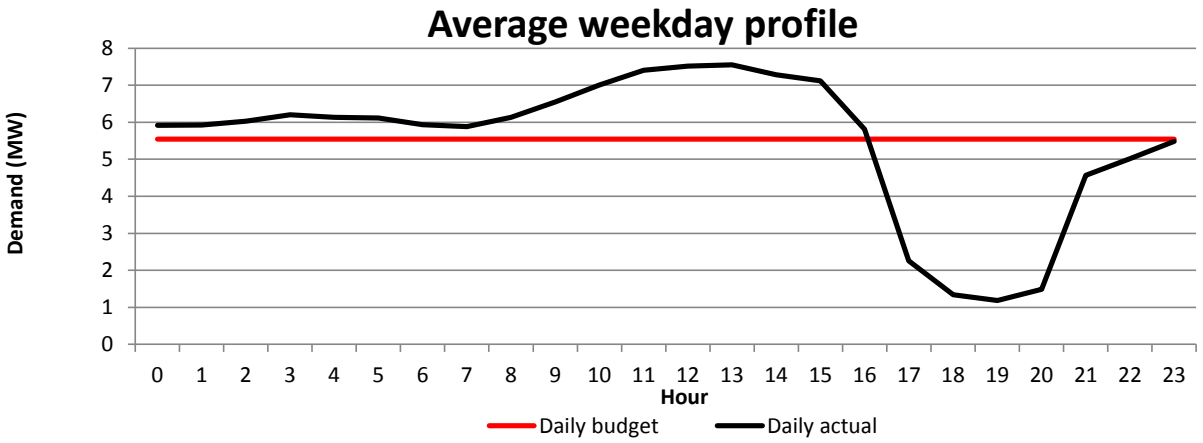


Figure 2-15: Average weekday profile

2.6 Fans

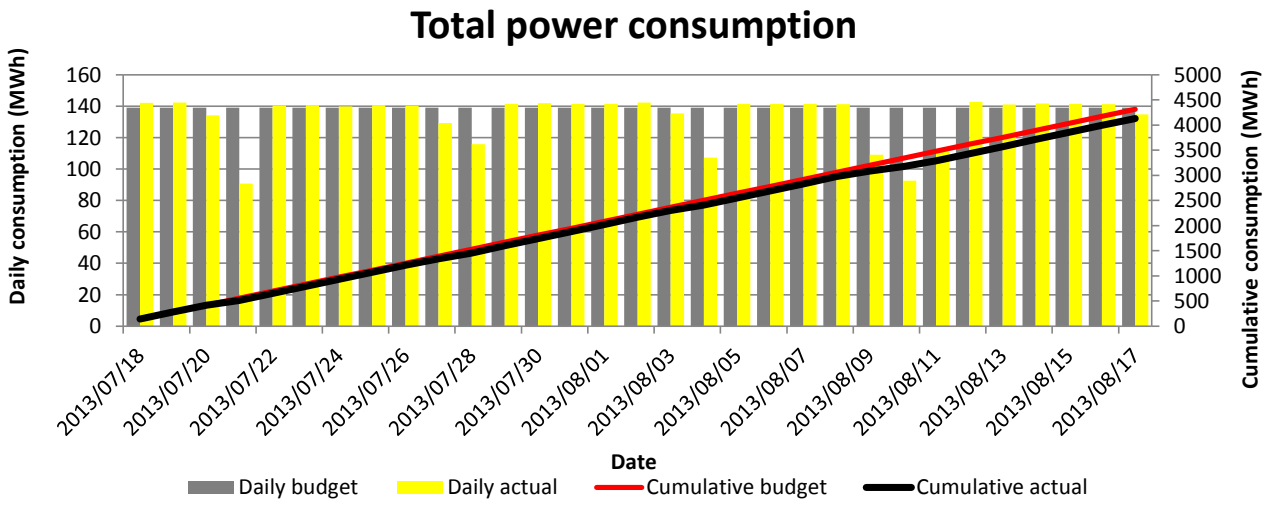


Figure 2-16: Total and daily power consumption

Figure 2-17: TOU performance

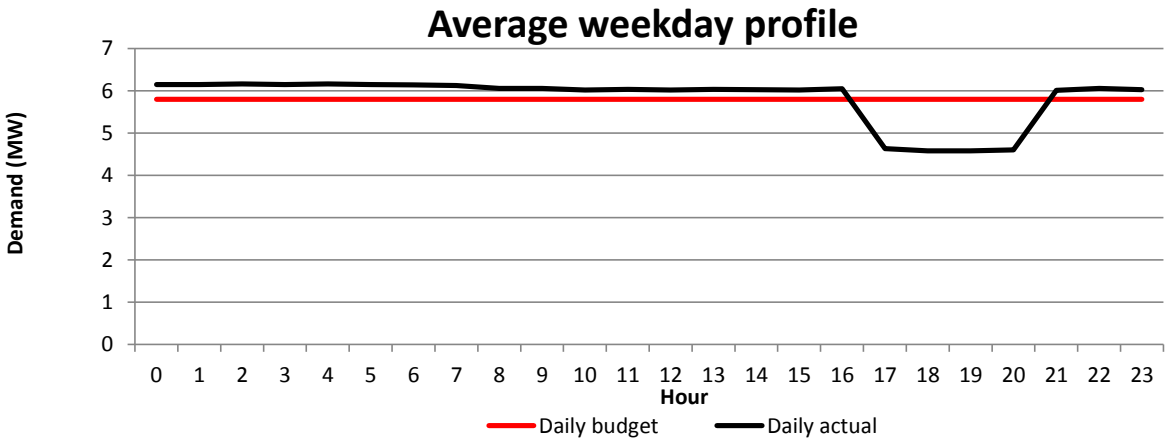


Figure 2-18: Average weekday profile

2.7 General

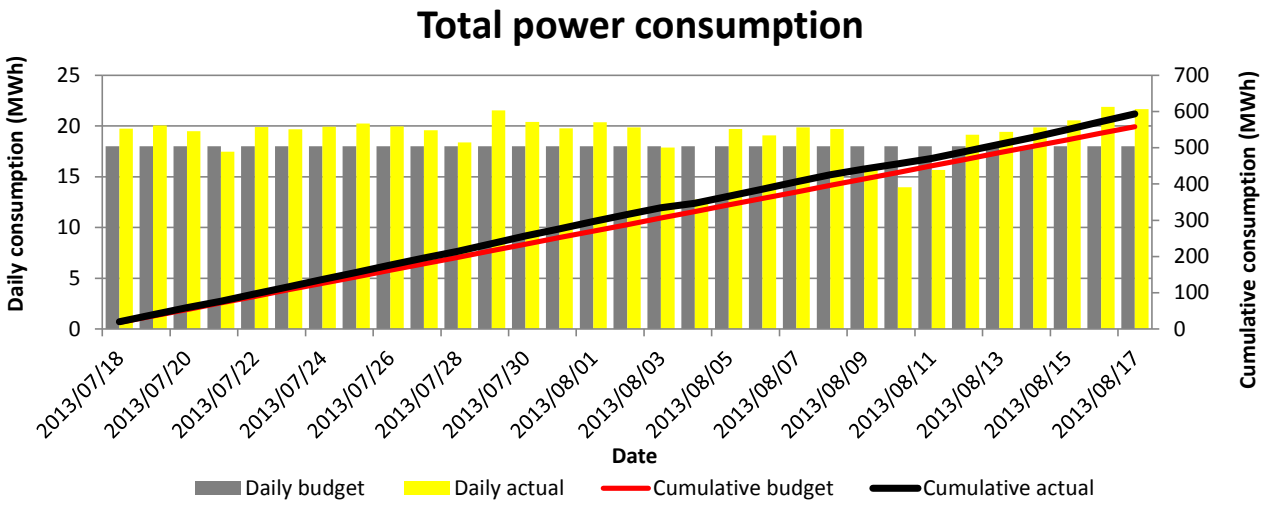


Figure 2-19: Total and daily power consumption

Figure 2-20: TOU performance

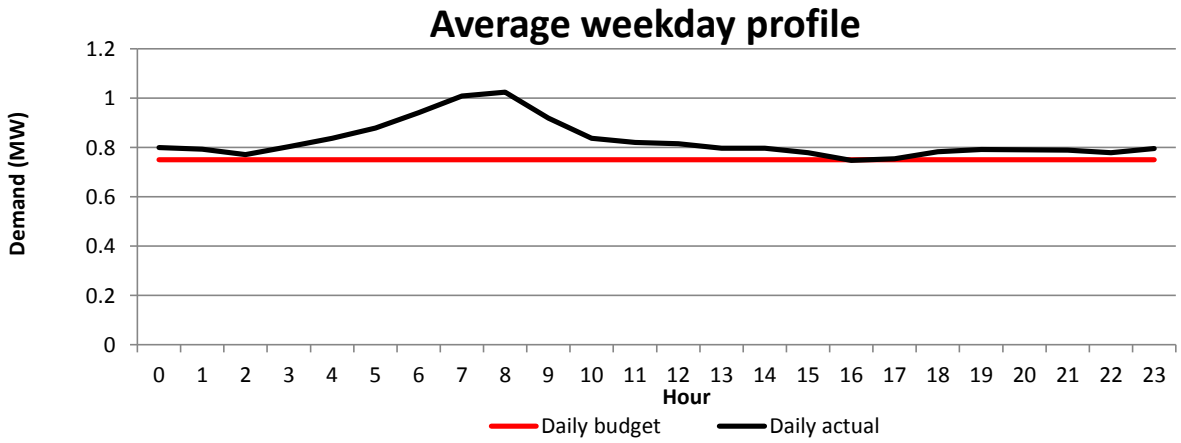


Figure 2-21: Average weekday profile

2.8 Decline pumping

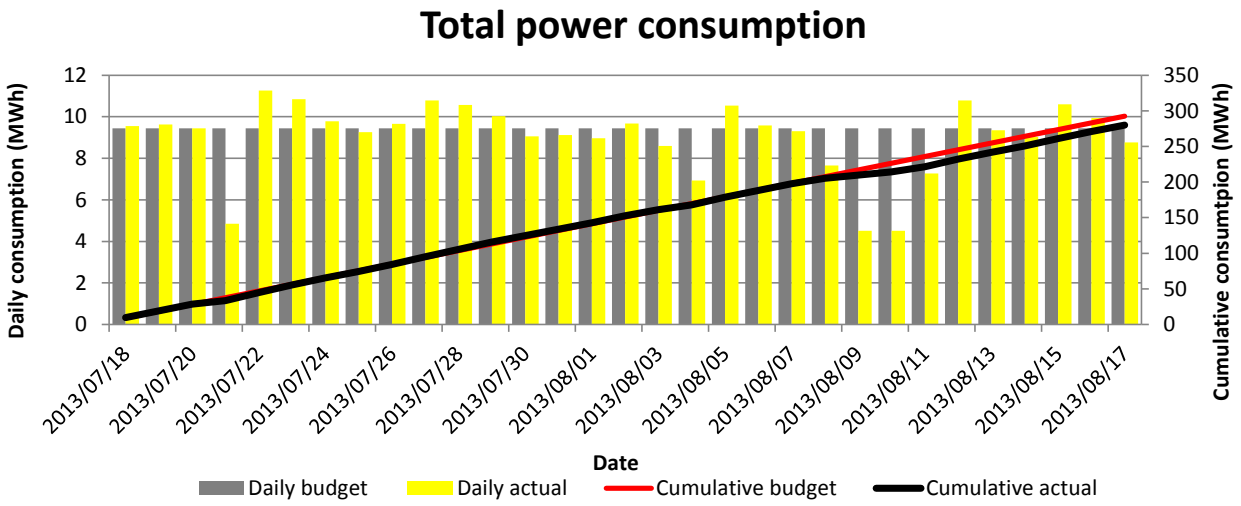


Figure 2-22: Total and daily power consumption

Figure 2-23: TOU performance

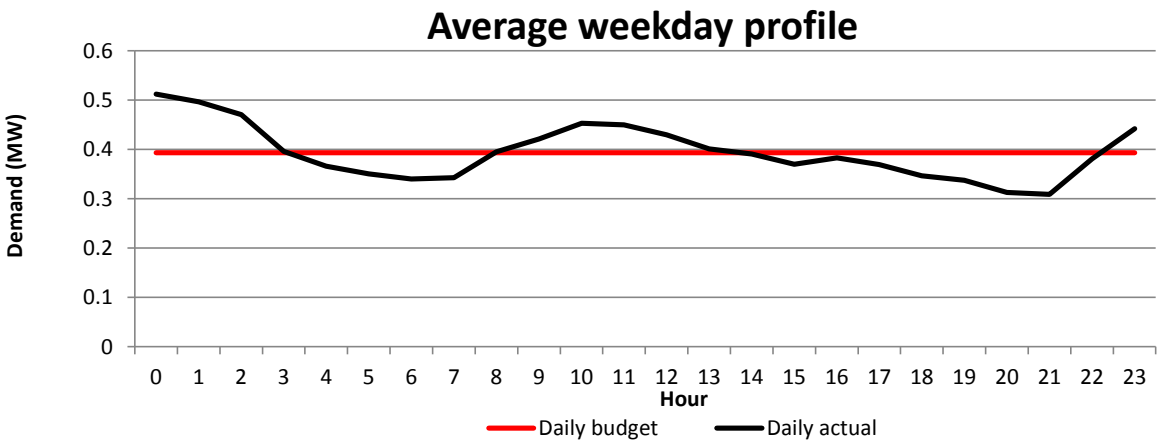


Figure 2-24: Average weekday profile

2.9 Hoisting

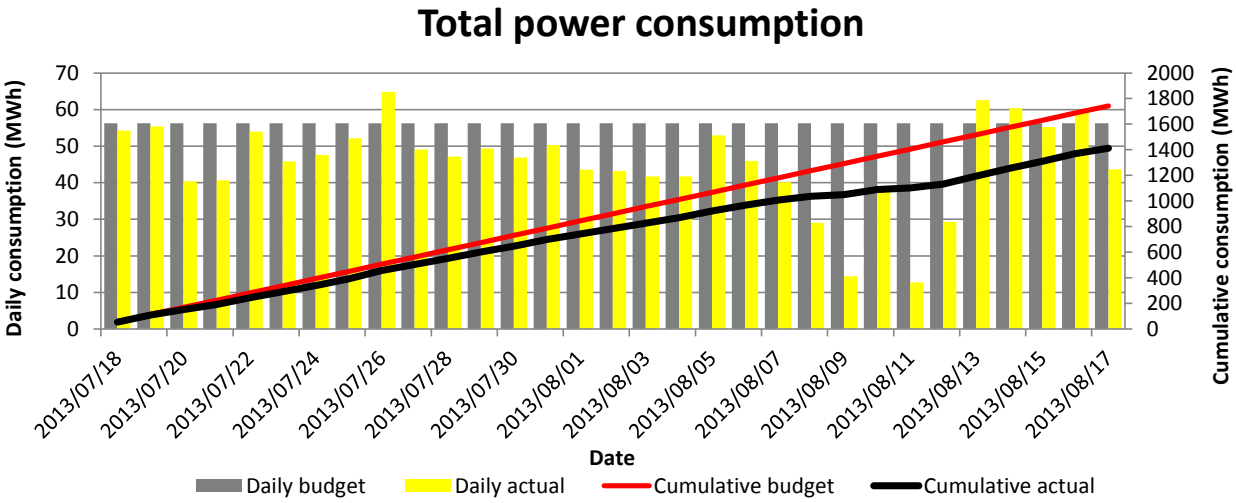


Figure 2-25: Total and daily power consumption

Figure 2-26: TOU performance

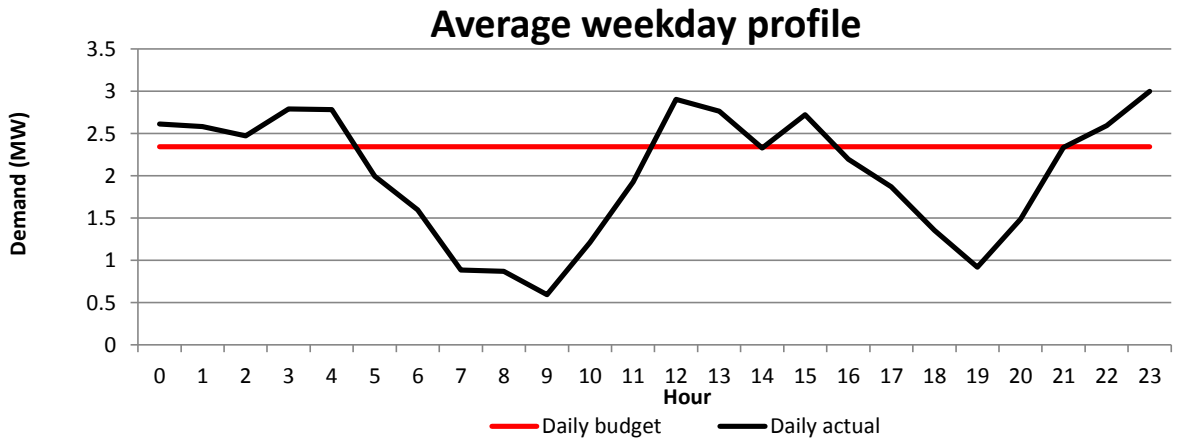


Figure 2-27: Average weekday profile

Appendix F : Monthly risk reports

RISK REPORT

Company name:

Generated on 10 October 2013

1 July 2012 - 30 June 2013

Index

1 Electricity tariffs

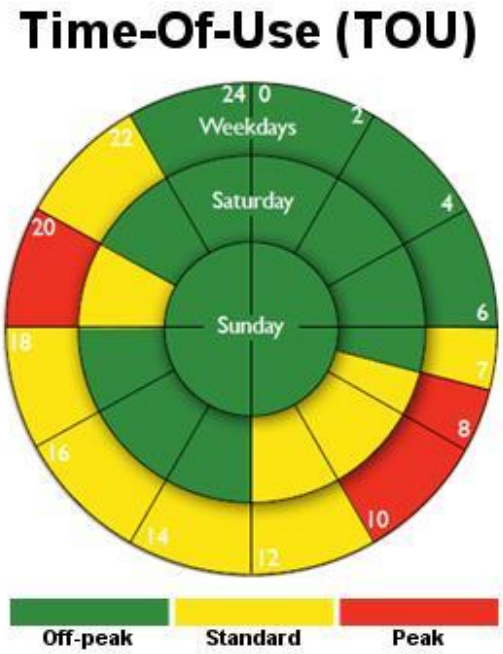


Figure 1-2: *Eskom time-of-use periods (Miniflex and Megaflex)*

Table 1-1: *Eskom time-of-use costs (ZARc/kWh)*

	MINIFLEX			MEGAFLEX		
	Peak	**Standard**	**Off-peak**	**Peak**	**Standard**	**Off-peak**
Low demand season	74.88	51.53	32.70	74.88	51.53	32.70
High demand season	229.52	69.53	37.76	229.52	69.53	37.76

*Assumptions: Distance <=300km, Voltage >=500V & <66kV

2 Electricity cost for

2.1 Electricity cost overview for

Table 2-1: *Electricity cost overview for the period: 1 July 2012 - 30 June 2013*

	1 July 2012 - 30 June 2013
Electricity cost	1,709.53 Million
Electricity cost budget	1,911.43 Million
Cost relative to budget	R 201.91 Million (11%) under budget

Table 2-1 presents an overview of ########'s electricity cost for the 1 July 2012 - 30 June 2013 financial year.

2.2 Monthly overview of electricity costs for

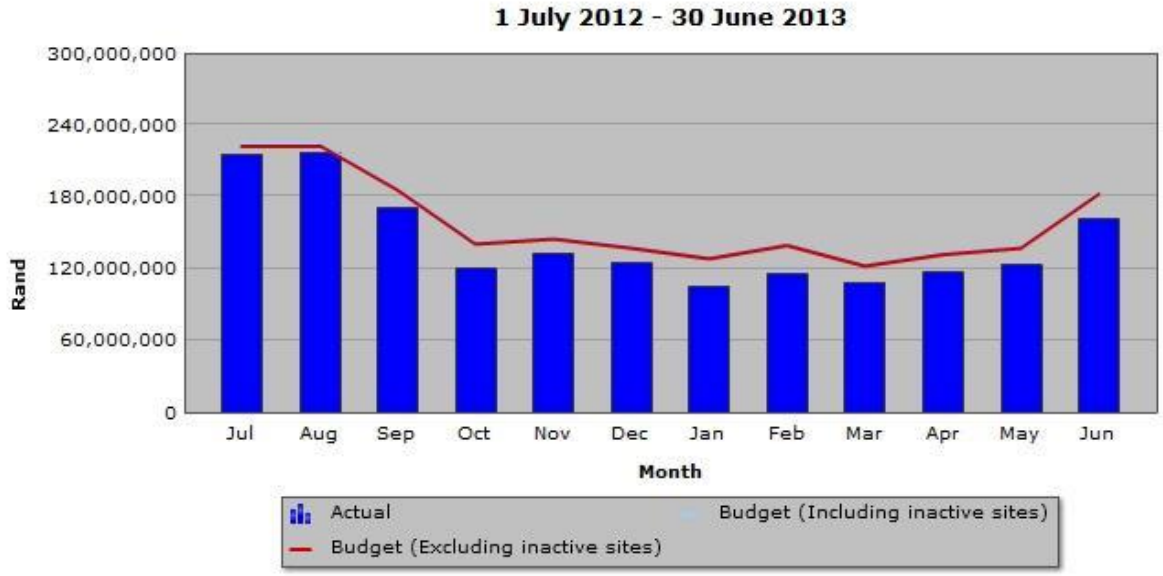


Figure 2-1: *Monthly overview of electricity costs*

Figure 2-1 shows the actual and budget cost values for the months with available data.

2.3 Electricity bill breakdown for

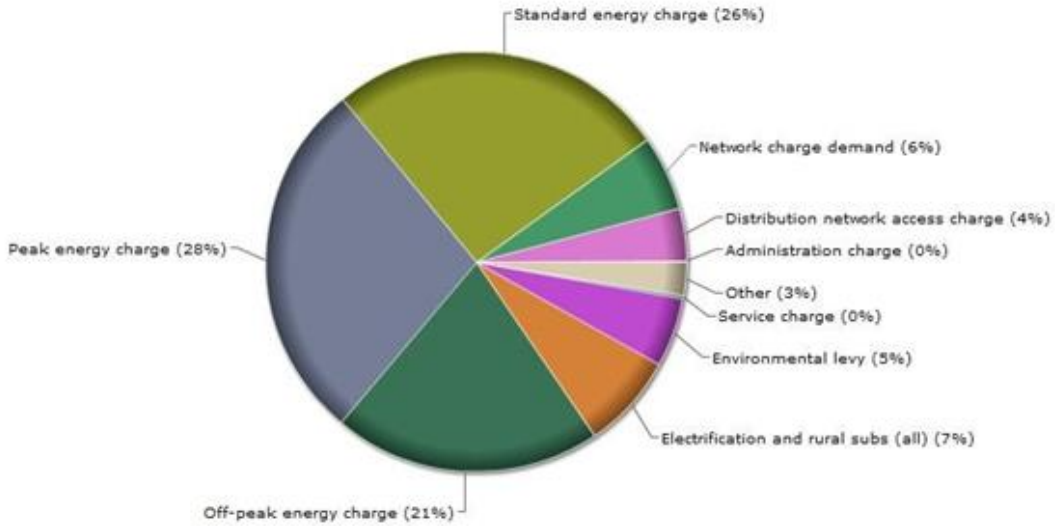


Figure 2-2: *Electricity bill breakdown*

2.4 Top ten electricity cost users breakdown for

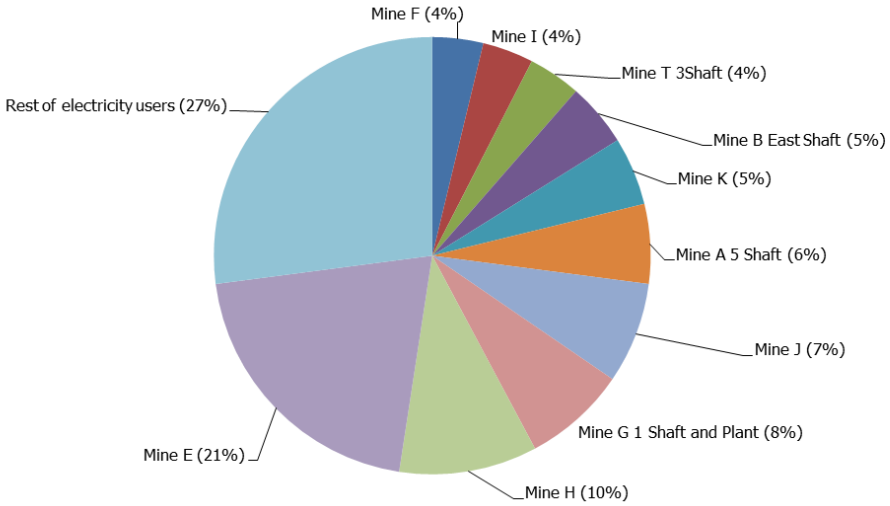


Figure 2-3: *Top ten electricity cost users breakdown*

Figure 2-3 shows the electricity cost breakdown of #######'s sites. The top three consumers are Mine E (20.50%), Mine H (10.23%) and Mine G- 1 Shaft and Plant (7.65%). The top ten consumers' cost share is 72.93% while the remaining sites contributes to 27.07% of the cost.

2.5 Cost distribution for

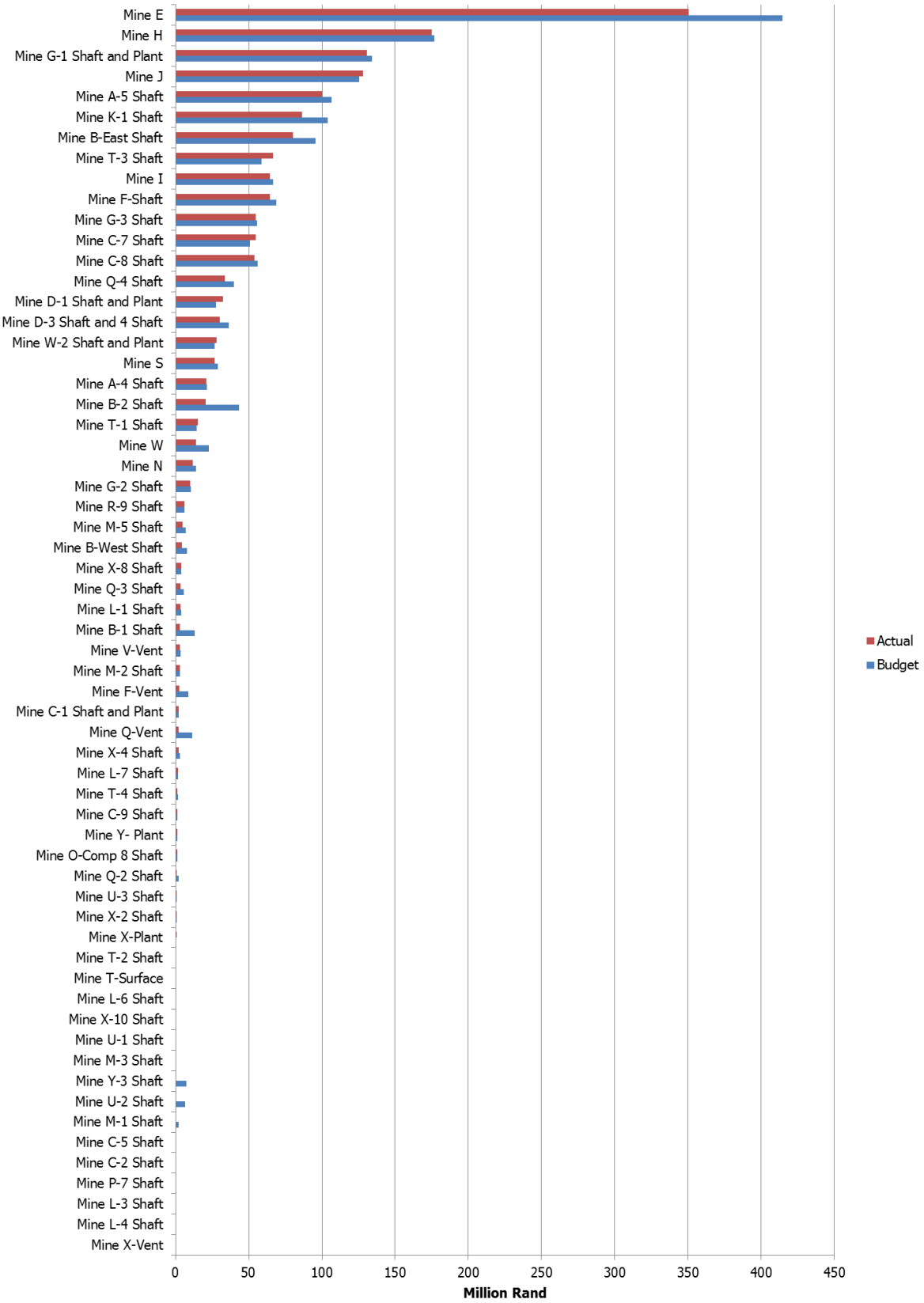


Figure 2-4: *Cost distribution breakdown*

Figure 2-4 compares the electricity cost and budget target associated for each site for the current financial year (1 July 2012 - 30 June 2013). Sites of which the budget drastically overshoots or undershoots the actual energy expenses should be investigated.

3 Electricity usage for

3.1 Electricity usage overview for

Table 3-1: *Electricity usage overview for the period: 1 July 2012 - 30 June 2013*

	1 July 2012 - 30 June 2013
Electricity usage	2,882.74 GWh
Electricity usage budget	3,297.73 GWh
Usage relative to budget	414.99 GWh (13%) under budget

Table 3-1 presents an overview of #######'s electricity usage for the 1 July 2012 - 30 June 2013 financial year.

3.2 Monthly overview of electricity usage for

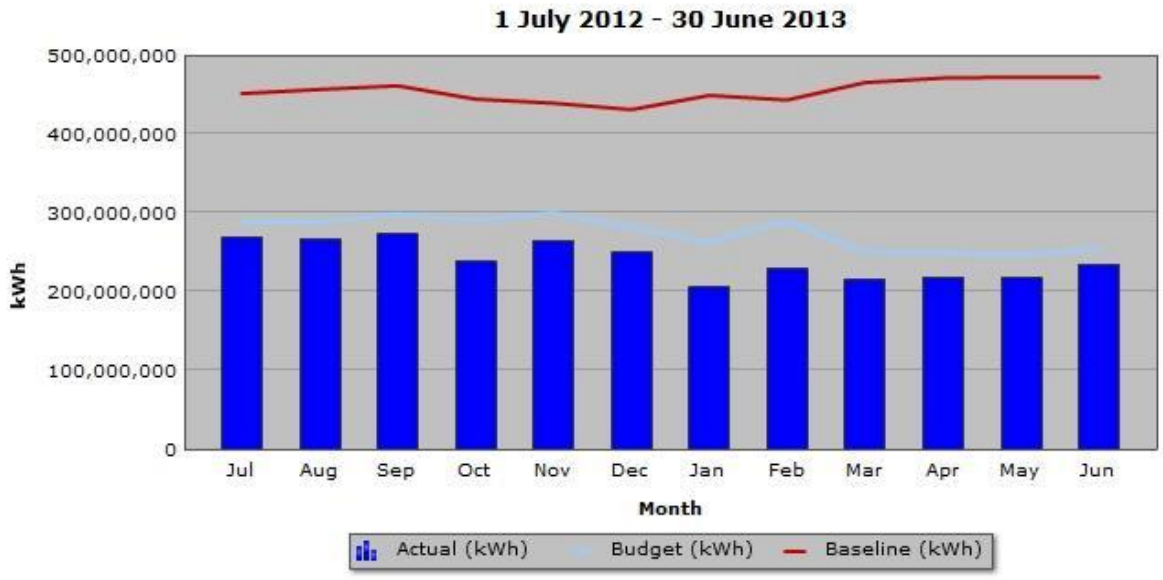


Figure 3-1: *Monthly overview of electricity usage*

Figure 3-1 shows the actual and budget cost values for the months with available data.

3.3 Top 10 electricity usage breakdown for

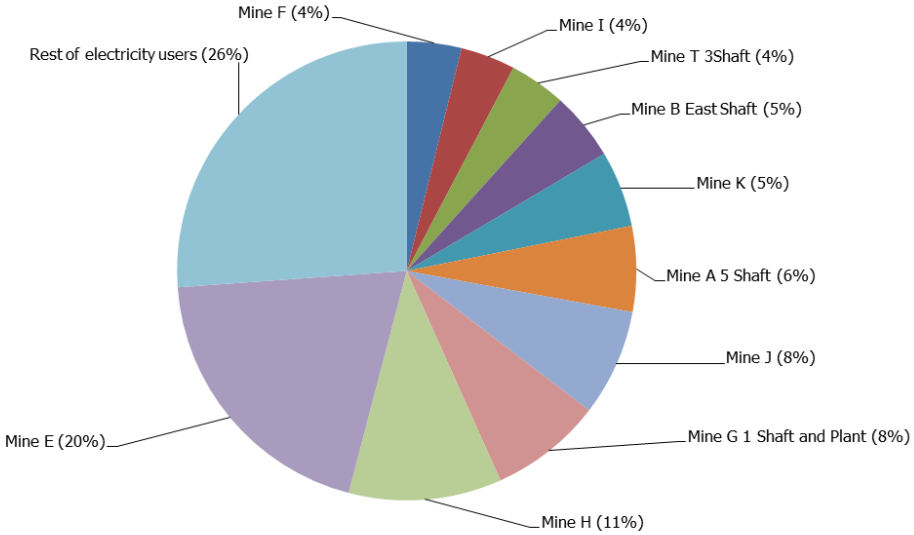


Figure 3-2: *Top 10 electricity usage users breakdown*

Figure 3-2 shows the electricity usage breakdown of #######'s sites. The top three users are Mine E (19.78%), Mine H (10.77%) and Mine G- 1 Shaft and Plant (7.91%). The top ten consumers' usage share is 73.86% while the remaining sites contributes to 26.14% of the usage.

3.4 Usage distribution for

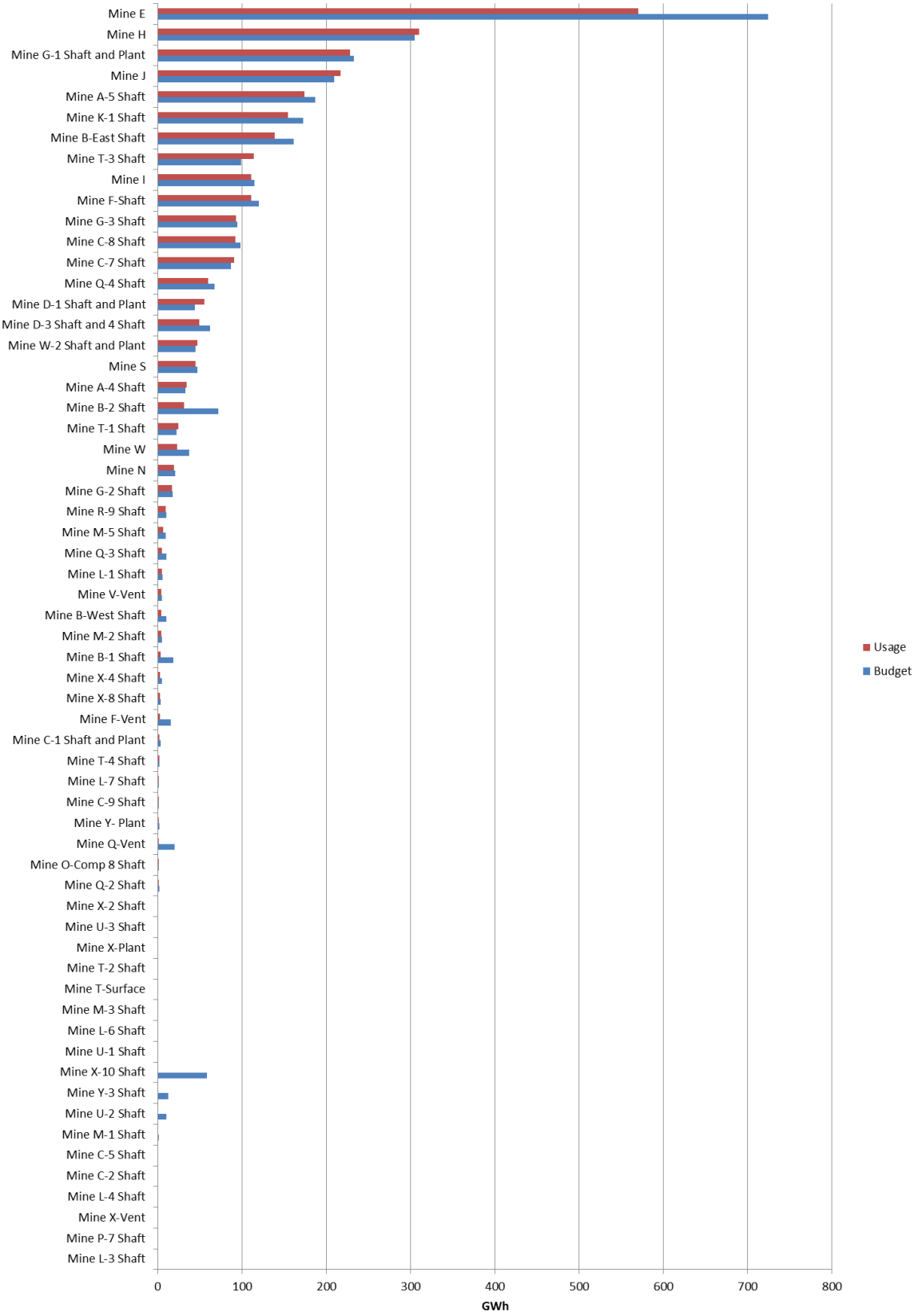


Figure 3-3: *Usage distribution breakdown*

Figure 3-3 compares the electricity usage and budget target associated for each site for the current financial year (1 July 2012 - 30 June 2013). Sites of which the budget drastically overshoots or undershoots the actual energy usage should be investigated.

4 Electricity account status history for

Table 4-1: *Monthly electricity account statuses*

	System	Months from 1 July 2012 - 30 June 2013											
1	Mine B-West Shaft	J	A	S	O	N	D	J	F	M	A	M	J
2	Mine L-6 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
3	Mine L-4 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
4	Mine L-7 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
5	Mine L-3 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
6	Mine B-East Shaft	J	A	S	O	N	D	J	F	M	A	M	J
7	Mine L-1 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
8	Mine C-2 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
9	Mine M-1 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
10	Mine M-3 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
11	Mine M-2 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
12	Mine J	J	A	S	O	N	D	J	F	M	A	M	J
13	Mine M-5 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
14	Mine C-1 Shaft and Plant	J	A	S	O	N	D	J	F	M	A	M	J
15	Mine C-5 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
16	Mine C-9 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
17	Mine C-7 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
18	Mine O-Comp 8 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
19	Mine C-8 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
20	Mine D-1 Shaft and Plant	J	A	S	O	N	D	J	F	M	A	M	J
21	Mine S	J	A	S	O	N	D	J	F	M	A	M	J
22	Mine E	J	A	S	O	N	D	J	F	M	A	M	J
23	Mine D-3 Shaft and 4 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
24	Mine P-7 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
25	Mine R-9 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
26	Mine A-5 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
27	Mine A-4 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
28	Mine T-2 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
29	Mine U-1 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
30	Mine T-4 Shaft	J	A	S	O	N	D	J	F	M	A	M	J

Table 4-1: *Monthly electricity account statuses*

	System	Months from 1 July 2012 - 30 June 2013											
31	Mine T-Surface	J	A	S	O	N	D	J	F	M	A	M	J
32	Mine T-1 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
33	Mine U-2 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
34	Mine F-Vent	J	A	S	O	N	D	J	F	M	A	M	J
35	Mine F-Shaft	J	A	S	O	N	D	J	F	M	A	M	J
36	Mine U-3 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
37	Mine U-3 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
38	Mine T-3 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
39	Mine V-Vent	J	A	S	O	N	D	J	F	M	A	M	J
40	Mine X-2 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
41	Mine G-2 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
42	Mine X-4 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
43	Mine W	J	A	S	O	N	D	J	F	M	A	M	J
44	Mine G-1 Shaft and Plant	J	A	S	O	N	D	J	F	M	A	M	J
45	Mine X-Vent	J	A	S	O	N	D	J	F	M	A	M	J
46	Mine Y- Plant	J	A	S	O	N	D	J	F	M	A	M	J
47	Mine H	J	A	S	O	N	D	J	F	M	A	M	J
48	Mine Y-3 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
49	Mine G-3 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
50	Mine N	J	A	S	O	N	D	J	F	M	A	M	J
51	Mine K-1 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
52	Mine Q-2 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
53	Mine Q-3 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
54	Mine Q-4 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
55	Mine Q-Vent	J	A	S	O	N	D	J	F	M	A	M	J
56	Mine B-1 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
57	Mine B-2 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
58	Mine X-Plant	J	A	S	O	N	D	J	F	M	A	M	J
59	Mine X-10 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
60	Mine X-8 Shaft	J	A	S	O	N	D	J	F	M	A	M	J
61	Mine I	J	A	S	O	N	D	J	F	M	A	M	J

Legend	
	Actual > Budget
	Actual <= Budget
	No data available

5 Risks for

5.1 Projected PCP/ECS penalties for

No applicable penalties for 1 July 2012 - 30 June 2013

5.2 Carbon Tax for

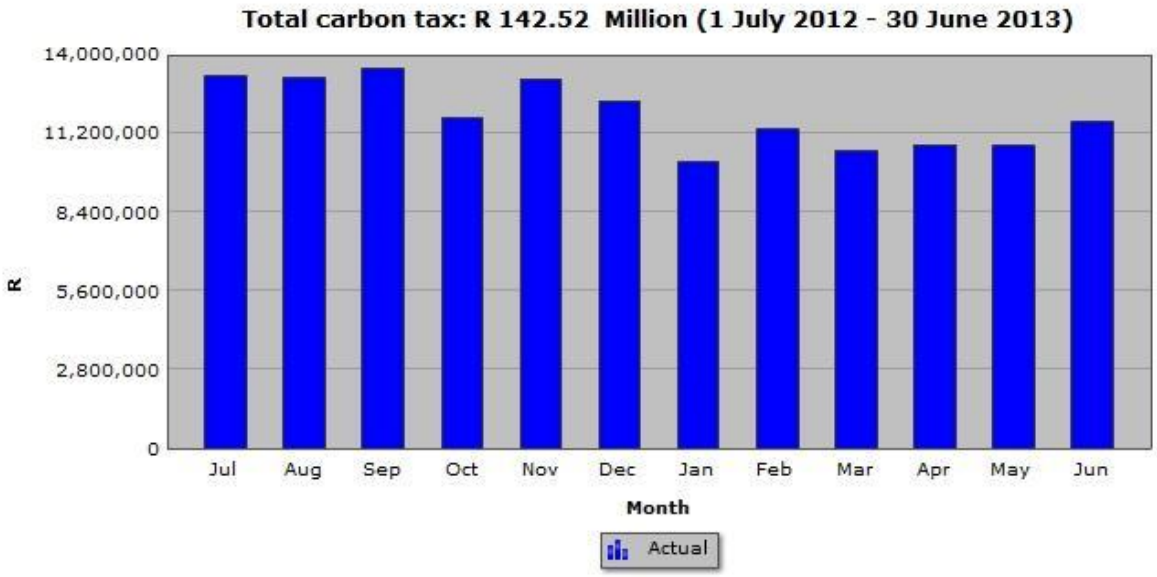


Figure 5-1: *Projected monthly carbon tax*

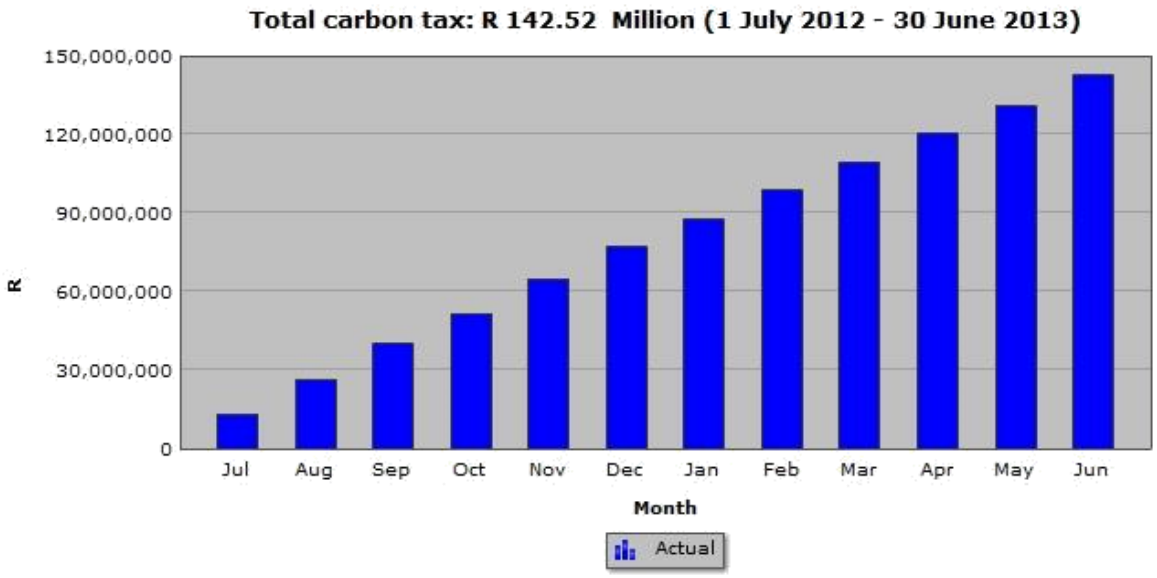


Figure 5-2: *Projected cumulative carbon tax*

Figure 5-2 shows the cumulative carbon tax approximation. The exact carbon tax rates have not been established. The latest updates from the budget speech were:

- The estimated start date for carbon tax is 1 January 2015.
- The proposed tax rate would be R120 per tonne of CO2 equivalent.
- The carbon tax rate could increase by 10% annually from 2015 till 2020.
- Only the last 40% of the total CO2 emissions will be taxed.
- An offset percentage of 5-10% could be introduced to allow investment of other projects.
- Gradual phasing out of the environmental levy could be performed once carbon tax is considered.
- Some of the revenues generated through carbon tax could fund energy efficient incentives.

The total carbon tax for Scope 2 emissions for 1 July 2012 - 30 June 2013 would have been R 142.52-million should the proposed legislation have been implemented. It is not certain when the legislation will be promulgated and what the exact tax rate per tonne will be.

Scope 2 emissions are energy indirect emissions and are associated with the use of purchased grid electricity generated by Eskom. Scope 1 emissions are direct emissions released primarily as a result of the combustion of fossil fuels on site and therefore cannot be included in this report.

5.3 Electricity cost inflation for

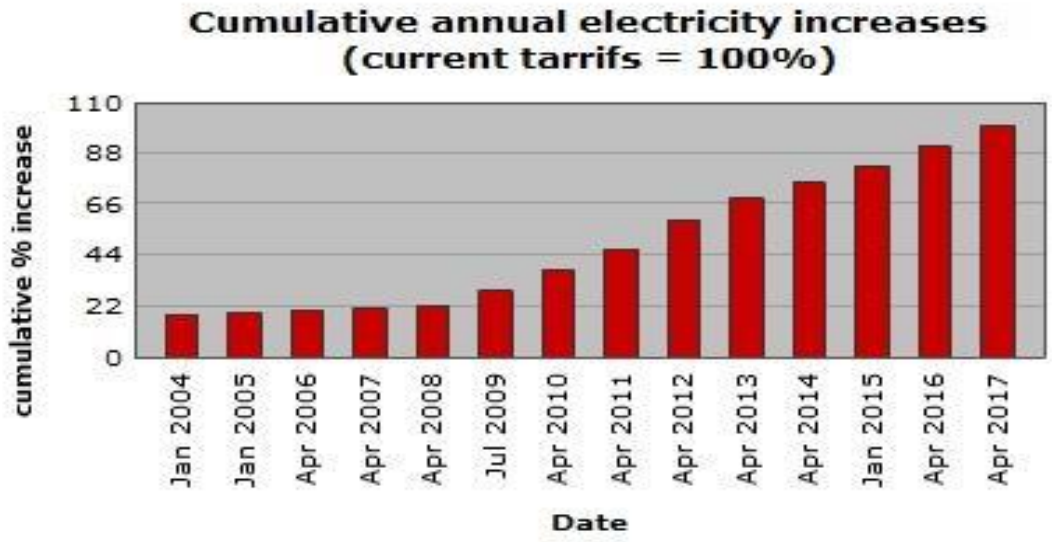


Figure 5-3: *Electricity cost inflation*

The electricity cost inflation relative to 2011 is shown in Figure 5-3. Note that the inflation rate of electricity has increased drastically. The current rate of electricity inflation exceeds the CPI by far.

Figure 5-4: *Current and future inflated electricity cost*

5.4 Reactive power for

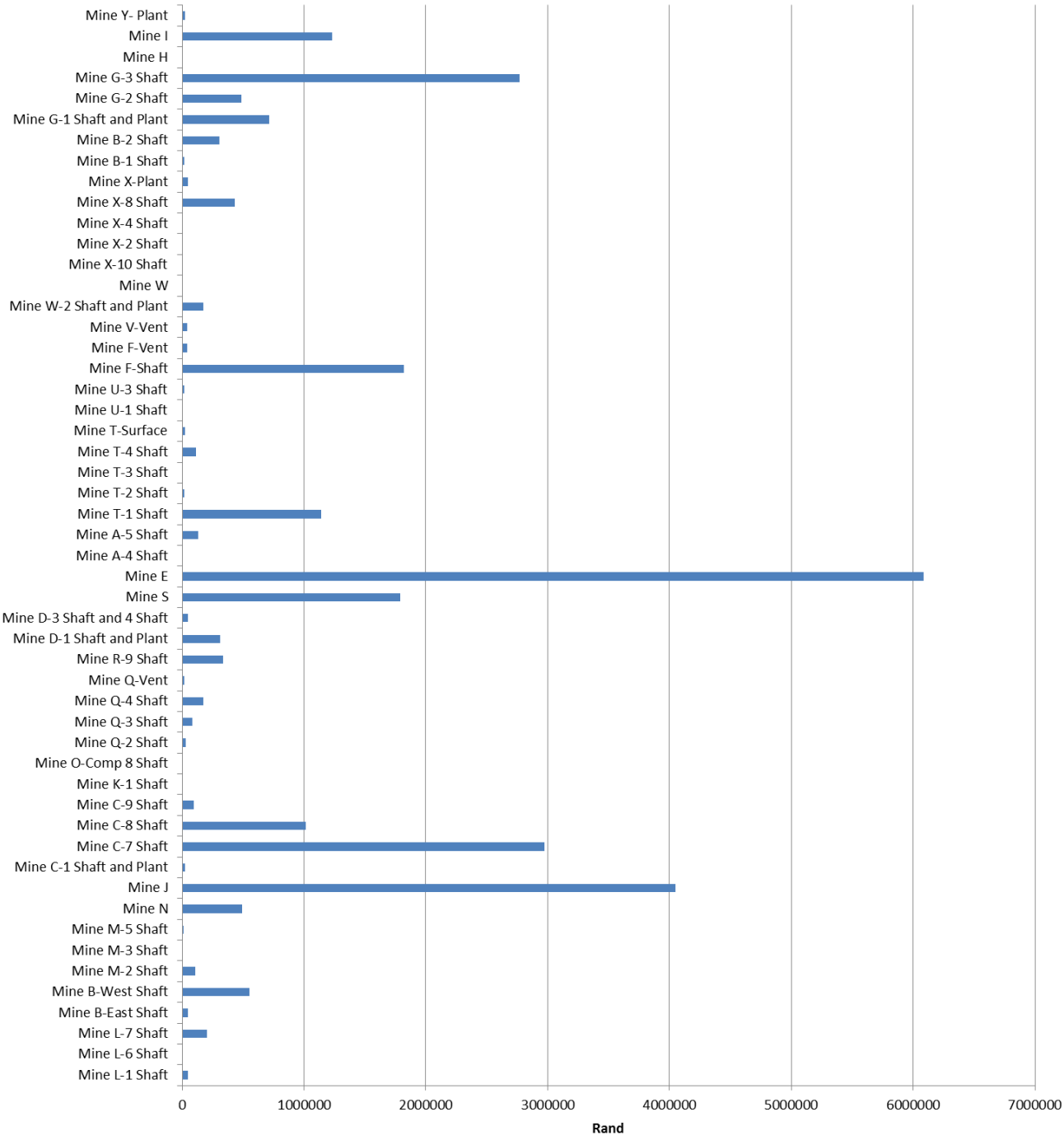


Figure 5-5: *Reactive power charge*

6 Opportunities for

6.1 Potential Carbon Credits for

Table 6-1: *Certified Emission Reduction (CER) projects*

	Project name	CER target (MW)	Project category	Available net income (%)	Start date	Projected lifespan (years)
1	Mine B FP	0.45	Cat 2: Primary ERPA for CERs	75	2012-05	21
2	Mine B OAN	2.30	Cat 1: Primary ERPA for CERs	35	2011-03	7
3	Mine E WSO	0.50	Cat 1: Primary ERPA for CERs	40	2011-05	7
4	Mine H OAN	0.35	Cat 3: Primary ERPA for CERs	75	2012-04	21

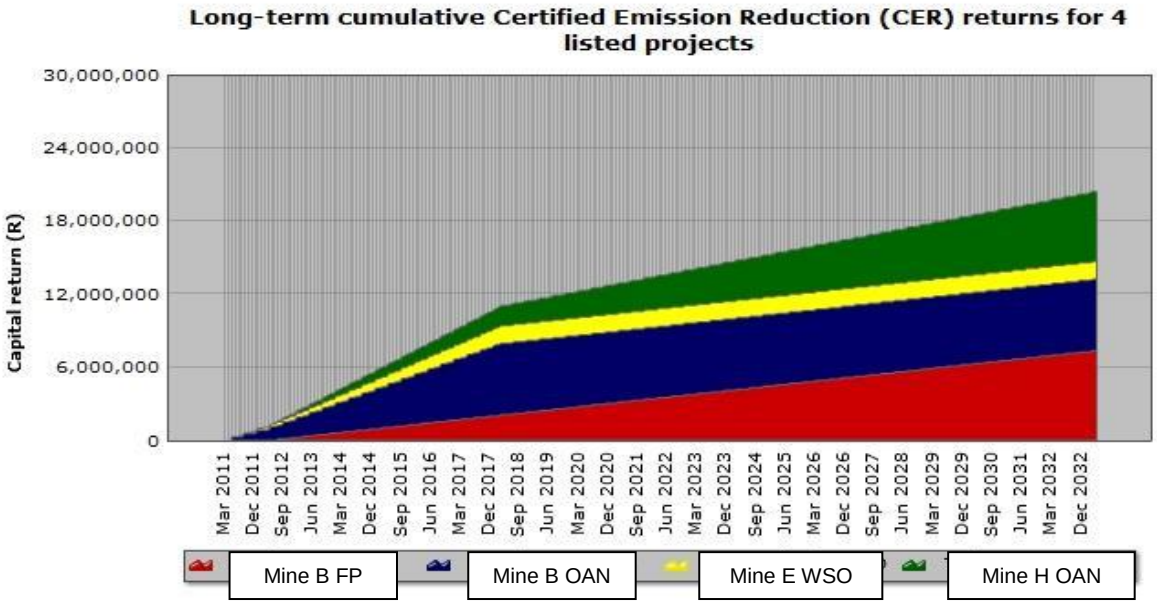


Figure 6-1: *Projected cumulative CER savings*

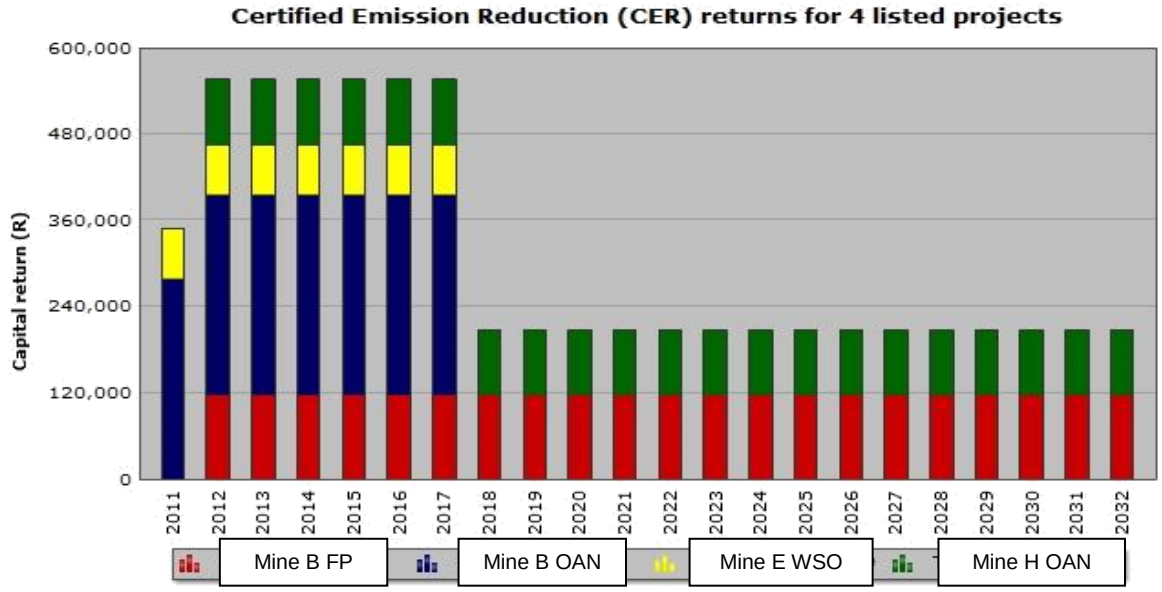


Figure 6-2: *Projected yearly CER savings*

6.2 Electricity Time-Of-Use (TOU) breakdown for

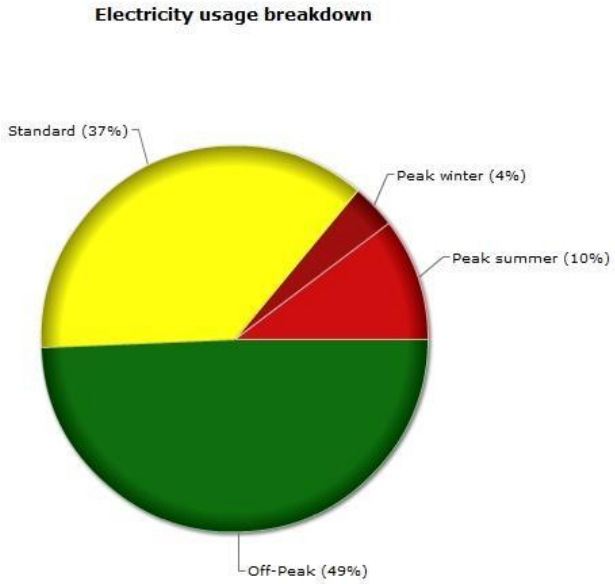


Figure 6-3: *Primary consumed*

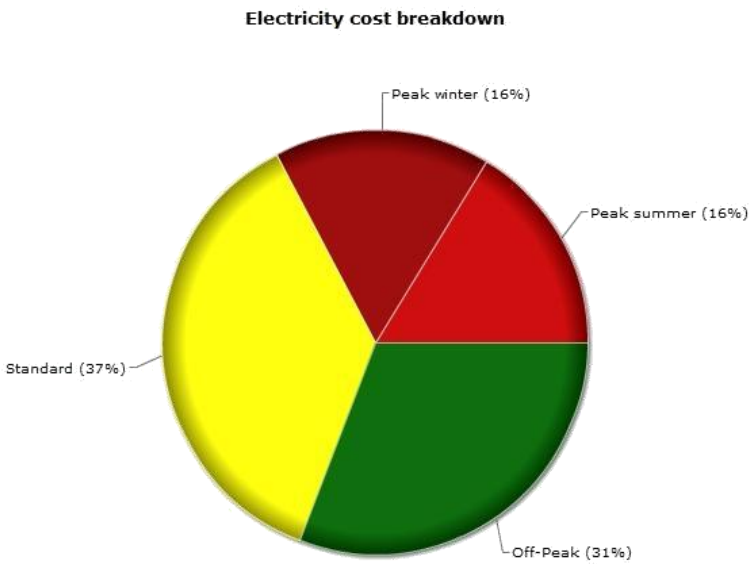


Figure 6-4: *Primary cost*

Note that although only 4% of the total electricity is used during peak-times in the winter, this costs 16% of the total electricity bill. Major cost savings can be achieved by reducing electricity use during peak-times in the winter months.

7 Business

7.1 Share price history

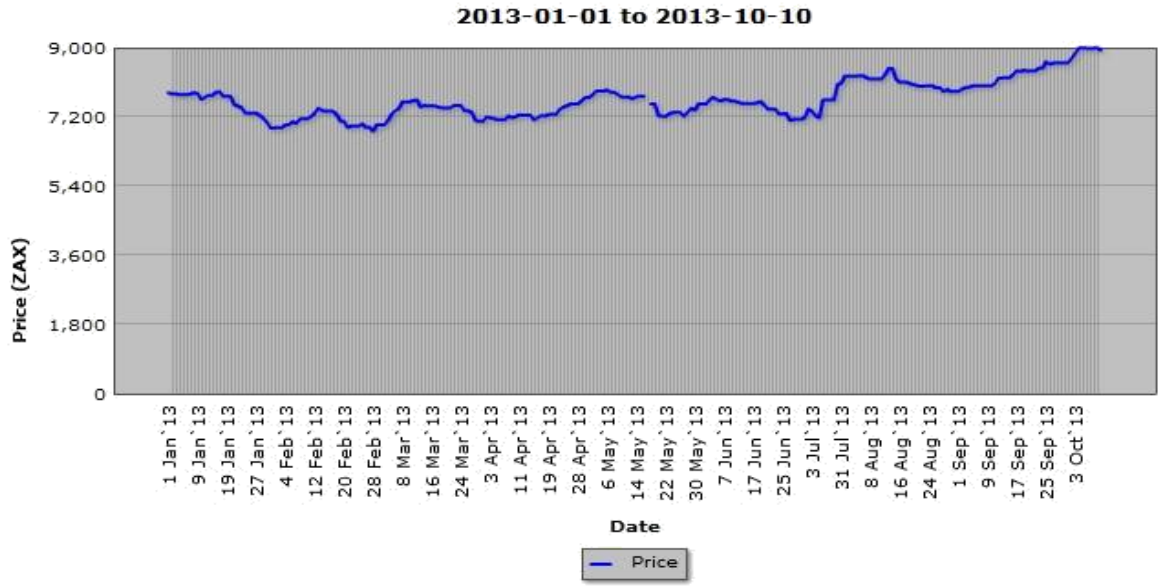


Figure 7-1: *######## share price history*

During the last month, the highest closing market price was R 39.85 and the lowest R 31.85. Note that 1 ZAR = 100 ZAX

7.2 Gold price

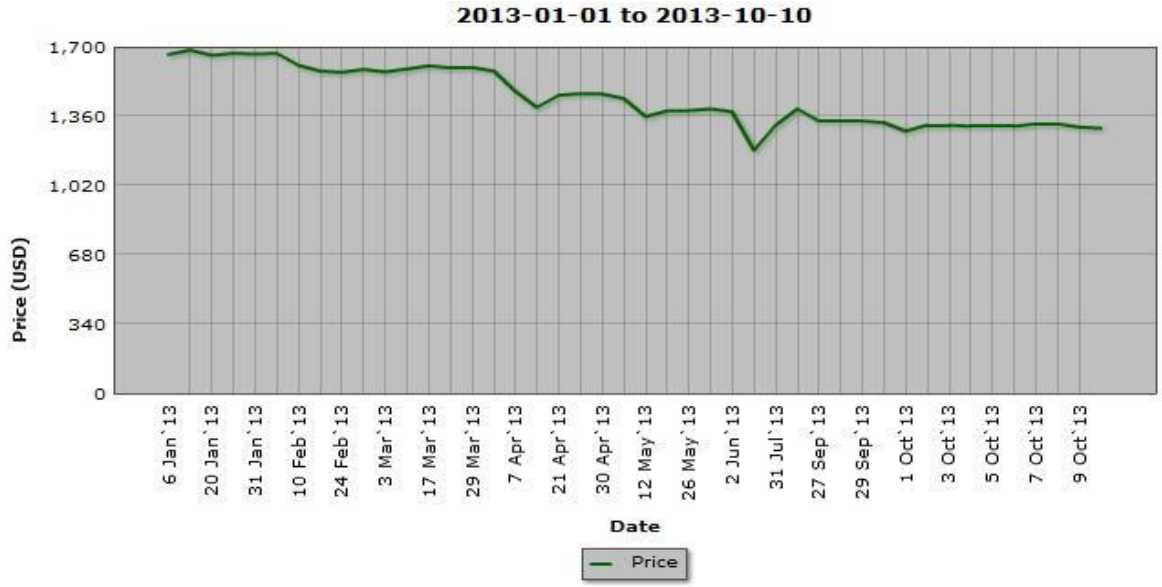


Figure 7-2: *Gold Price in USD*

During the last month, the highest closing market price was 1,336 USD and the lowest 1,288 USD.

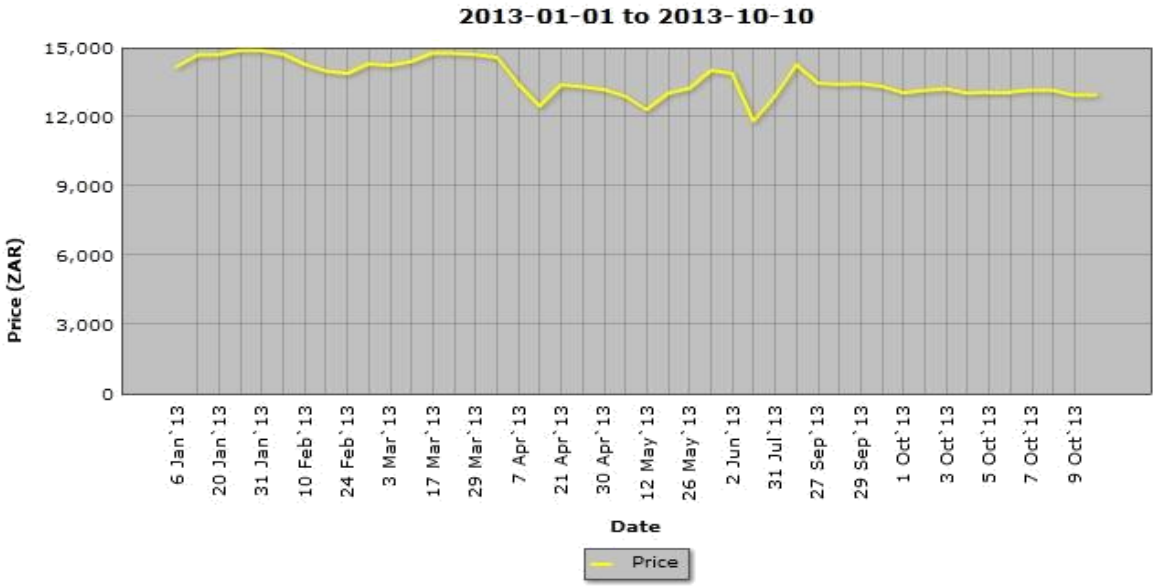


Figure 7-3: *Gold Price in ZAR*

7.3 Exchange rate

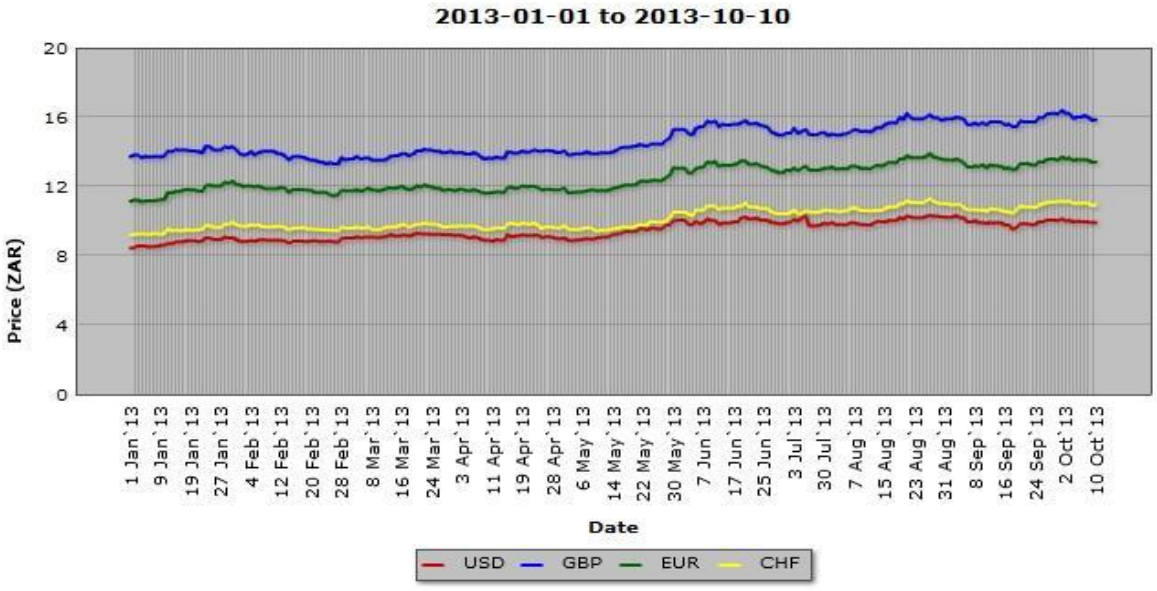


Figure 7-4: *Exchange rates relative to South African Rand (ZAR)*

References: Appendix

[1] Eskom, "Tariffs and charges booklet 2011/12", www.eskom.co.za.