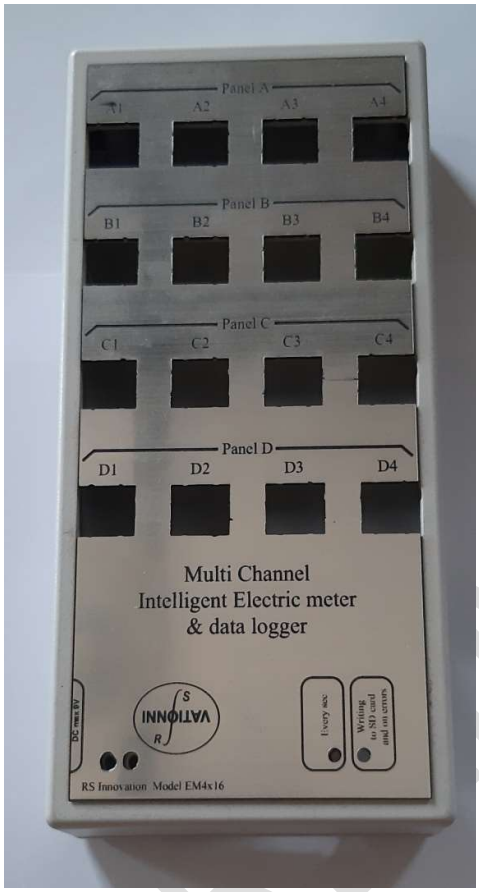
RS Innovation has designed a state-of-the art electronic smart kWhr meter system which can monitor the energy consumption of up to 48 single phase users or 16 three phase users. A split-core current transformer or current clamp is simply clipped around each cable to be monitored. The system is thus easily connected to a live DB.



The system measures and/or keeps track of:

- active and reactive energy
- maximum demand
- time of use tariff (see table I)
- low and high demand season

The system will read the energy usage every 60 seconds. Every hour, the energy consumption is accumulated in one of 3 registers:

LOW tariff register

STANDARD tariff register

PEAK tariff register

At the end of the day, this information is stored to the micro SD card in a CSV text file. This file is thus easily opened by Microsoft Excel and transformed into a graph with a few clicks of the mouse. A new file is created for every day.

An email will be send daily, weekly or monthly to the managing agent or body corporate.

The equipment is easy to operate and has no batteries which could require maintenance. When the power is ON, the system records energy. When the power goes off, the system stores the current vital data and makes a log of when the power went OFF. When the power comes back on, the system continues recording.

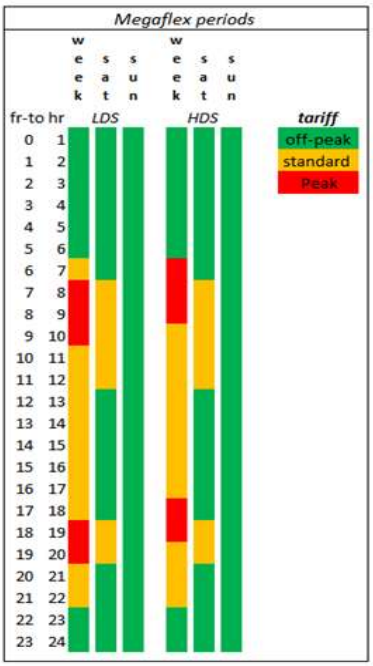
Industrial tariff example: Megaflex

NERSA (National Energy Regulator of SA) has introduced complex tariff structures for commercial users. The following tariff is an example for 3-phase complexes using more than 50kVA (78Amps per phase). There are many different tariff structures.

Electrical tariff "Time of Use", Tshwane valid until 30 Jun 18

10 Low voltage 3-phase demand >50kVA		Fixed	rate per kVA
		R 2 224	160.00
	Plus:		
	LDS=Low Demand Season SEP-MAY		rate in cents/KWhr
	off-peak		58.60
	standard		82.75
	Peak		131.40
	HDS=High Demand Season JUN-AUG		
	off-peak		70.20
	standard		122.60
	Peak		319.90

Note: According to NERSA, maximum demand is measured over a 30min period



Many industrial complexes will have a pre-paid intelligent meter which keeps track of the energy used during off-peak, standard and peak periods.

If the individual units/factories only have conventional energy meters installed, the body corporate has then no choice but to split up the bulk meter pro-rata the individual factory readings.

That's alright if all users have similar consumption patterns. However if there's 1 "heavy" user in the complex, everyone else will subsidise that unit's maximum demand charge.

At the other end of the spectrum: it almost doesn't make sense for 1 user to avoid the peak tariff periods, as theirs savings will not truly reflect on their bills.

The solution: all units must use smart meters.

Emails & Excel

The table below was obtained by cut & paste the text from an email into a spreadsheet. In this case, an email was sent every hour. Normally, and email would only be send daily, weekly or monthly.

Fri-09/03/2018	EA11	ER11	EA12	ER12	EA13	ER13	EA21	ER21	EA22	ER22
until_17:59										
Low-kWhr	0	0	0	0	0	0	0	0	0	0
Std-kWhr	4.16	-0.76	9.39	-6.79	19.47	1.54	2.52	-0.47	0.12	-0.2
Peak-kWhr	0	0	0	0	0	0	0	0	0	0
VAmax-VA	1562	----	2487	----	6523	----	1323	----	30	----
Fri-09/03/2018	**EA11**	**ER11**	**EA12**	**ER12**	**EA13**	**ER13**	**EA21**	**ER21**	**EA22**	**ER22**
until_18:59										
Low-kWhr	0	0	0	0	0	0	0	0	0	0
Std-kWhr	4.16	-0.76	9.39	-6.79	19.47	1.54	2.52	-0.47	0.12	-0.2
Peak-kWhr	0.1	-0.01	2.18	-1.7	1.78	0.08	0.01	-0.01	0.03	-0.05
VAmax-VA	1562	----	2487	----	6523	----	1323	----	30	----
Fri-09/03/2018	**EA11**	**ER11**	**EA12**	**ER12**	**EA13**	**ER13**	**EA21**	**ER21**	**EA22**	**ER22**
until_19:59										
Low-kWhr	0	0	0	0	0	0	0	0	0	0
Std-kWhr	4.16	-0.76	9.39	-6.79	19.47	1.54	2.52	-0.47	0.12	-0.2
Peak-kWhr	0.21	-0.03	4.35	-3.4	3.46	0.12	0.03	-0.02	0.06	-0.1
VAmax-VA	1562	----	2487	----	6523	----	1323	----	30	----

Specifications smart meter

Power supply:	210 to 250V, 10W
Operating temperature:	0 to 50°C
Sampling time:	60s
Channels:	48x single phase or 16x three-phase
Voltage measurement:	TRUE-RMS 180 to 250V, better than 1%
Current measurement:	0.1A to 800A, better than 1.5%
Power measurement:	better than 2%
Real time clock accuracy:	100ppm which translates to better than 8.6s per day. Accumulative drift eliminated when used with a GPRS unit.
Data storage:	micro SD card in SD card holder. A 16G card can hold enough data to log for 140 years!
Computer interface:	USB-2 (not required for operation)