



QUEENSLAND FARMERS' FEDERATION



Bundaberg  
Fruit & Vegetable  
Growers



## HQ PLANTATIONS FIELD DAY

Information for all flowers, horticulture and nurseries to  
improve your competitiveness and increase your profitability

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# Energy Savings Initiatives

- Understanding Your Bill
- LED Lighting
- Power Factor Correction
- Solar PV



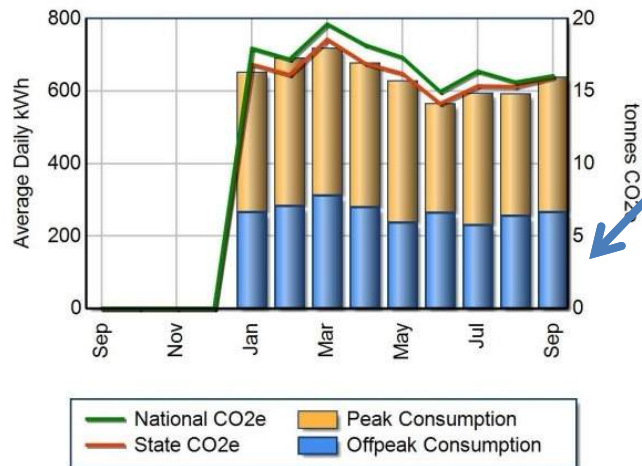
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# Understanding Your Bill

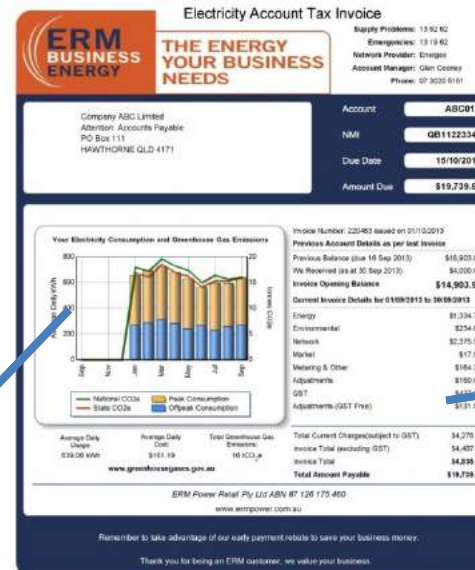
Your Electricity Consumption and Greenhouse Gas Emissions



Average Daily  
Usage:  
639.06 kWh

Average Daily  
Cost:  
\$161.19

Total Greenhouse Gas  
Emissions:  
16 tCO<sub>2</sub>e



Invoice Number: 220463 issued on 01/10/2013

## Previous Account Details as per last Invoice

Previous Balance (due 16 Sep 2013)	\$18,903.95
We Received (as at 30 Sep 2013)	\$4,000.00
<b>Invoice Opening Balance</b>	<b>\$14,903.95</b>

## Current Invoice Details for 01/09/2013 to 30/09/2013

Energy	\$1,334.72
Environmental	\$234.08
Network	\$2,375.58
Market	\$17.59
Matching & Other	\$164.38
Adjustments	\$150.00
GST	\$427.63
Adjustments (GST Free)	\$131.59

Total Current Charges(subject to GST)	\$4,276.31
Invoice Total (excluding GST)	\$4,407.91
Invoice Total	<b>\$4,835.51</b>
<b>Total Amount Payable</b>	<b>\$19,739.51</b>

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NMI: QB11223344  
 Address: Sample Road, HAWTHORNE, QLD 4171  
 Period: 01/09/2013 to 30/09/2013 (30 days)

## Energy

- Billed in kWh for Peak and Off Peak Consumption

Pricing Details				Account: ABC01
Charges	Usage	Unit Price	Loss Factor	Total Price (excl GST)
<b>Energy</b>				
QLD Peak	11,192.770 kWh	5.1920 c/kWh	1.06824	\$620.78
QLD Off Peak	7,979.010 kWh	3.5199 c/kWh	1.06824	\$300.02
Carbon	19,171.780 kWh	2.0211 c/kWh	1.06824	\$413.92
<b>Environmental</b>				
GECs	19,171.780 kWh	0.0168 c/kWh		\$3.22
LRECs	19,171.780 kWh	0.4419 c/kWh	1.06430	\$90.17
SRECs	19,171.780 kWh	0.6895 c/kWh	1.06430	\$140.69
<b>Network</b>				
8300 Service Charge	30 Days	6.7720 \$/Day		\$203.16
8300 Energy	19,171.780 kWh	1.4390 c/kWh		\$275.88
8300 Demand	90.800 kW	20.8870 \$/kW/Mth		\$1,896.54
<b>Market</b>				
AEMO Ancillary Fee	19,171.780 kWh	0.0516 c/kWh	1.06430	\$10.53
AEMO Market Fee	19,171.780 kWh	0.0346 c/kWh	1.06430	\$7.06
<b>Metering &amp; Other</b>				
Meter Charge		2,000.00 \$/mtr/yr		\$164.38
GST				\$412.63
Total (excl GST)				\$4,126.35
<b>TOTAL for NMI QB11223344</b>				<b>\$4,538.98</b>

## Peak Demand

- Previously billed by the kW
- If this site had a PF of 0.85, the Demand Charge in kVA would be:
- $107\text{kVA} \times \$20.887 = \$2234.91$
- That's over \$4000 extra per year if not corrected!

### NMI Profile Summary

Highest actual metered demand this period:	90.84 kW
(Recorded 20/09/2013 18:30)	
Power Factor at time of highest metered demand:	0.962
Load Factor	29.3%
Carbon Intensity	0.83691
Distribution Loss Factor	1.06430
Transmission Loss Factor	1.00370
Net Loss Factor	1.06824
<b>TOTAL USAGE</b>	<b>19,171.78 kWh</b>

Meter	Usage (kWh)	Meter	Usage (kWh)
E1-210217554	19,171.78		



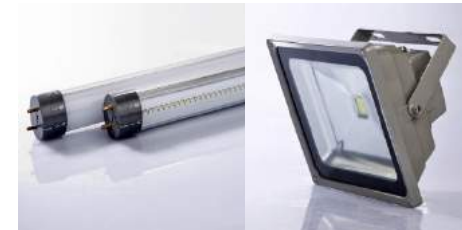
## Highest Metered Demand



# LED Lighting

What is an LED and what are the main benefits?

- LED = Light Emitting Diode
  - Lower wattage
    - Cheaper to run vs. incandescent lamps
  - Longer lifespan
    - LED's lifespan = 35,000 – 50,000hrs
      - Less replacement costs
      - Less maintenance costs



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# LED Lighting



What am I likely to save?

- Example – Company A replaces 100 Metal Halide High Bay Lights with LED High Bays
  - Metal Halide HB are 400W each + 50W ballast
  - LED HB are 200W each inc. driver
  - Operating Hours are 10 hours/day - 5 days/week

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# LED Lighting

What am I likely to save?  
Weekly Cost Comparison



Lamp Type	Lamp Qty.	Watts	Hrs. / Day	Days / Wk.	Watt hrs.	kWh	Example Energy Cost / kWh	Weekly Cost Comparison
Existing Metal Halide	100	450	10	5	22,500	22.5	\$ 0.25	\$ 562.50
LED	100	200	10	5	10,000	10	\$ 0.25	\$ 250.00

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# LED Lighting

What am I likely to save?

Total Savings Summary



Weekly Energy Saving	\$	312.50
Yearly Energy Saving	\$	16,250.00
10 Year Energy Saving	\$	162,500.00
2 Maintenance Cycles Save @ \$120	\$	24,000.00
Total Saving Over 10 Years	\$	<u>186,500.00</u>

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# Power Factor Correction

## What is Power Factor?

Power Factor is the measurement of how effectively electrical power is being used by a site.

The lower the Power Factor, the more reactive power the Utilities need to provide.

This can then result in larger capacity to supply power, capacity problems and can also lead to 'brown-outs'.

Most importantly, higher operating costs due to higher Peak Demand charges.

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# Power Factor Correction

## Energex Tariff Changes

On 1 July 2015, Energex changed how network tariffs for some large business customers are calculated – over 13000 businesses are affected.

## What do the changes mean?

Previously if you are on a Demand Tariff, you were billed for your Peak Demand in kW or (Active Power).

Now the changes are implemented, you are billed for your Peak Demand in kVA or (Apparent Power).

The difference is the lost power or kVAr or (Reactive Power), which makes the magnetic fields for inductive appliances.

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# Power Factor Correction

$$\text{kVA} = \text{kW} + \text{kVAr}$$

*The Beer Analogy*

*kVA = The Full Glass*

*kW = The Beer Liquid*

*kVAr = The Beer Foam*



***The higher the kVAr at your premises the more your bill will increase with the changes.***

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# Power Factor Correction

## How can you fix it and reduce your Peak Demand charges?

By installing Power Factor Correction equipment.

The benefits by installing a PFC unit include:

- Reduces Peak Demand charge
- Increases your sites power infrastructure
  - e.g. If your PF is 0.7 and you improve it to 0.95, on a 2000kVA substation this will free up over 500kVA or an extra 25% capacity
- Reduces power losses in site transformers and the network
- Helps stabilise your sites electrical system voltage levels

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# Power Factor Correction

## Energex Funding Assistance

- Business customers in certain areas may be eligible for some funding from Energex or Ergon to assist with the cost of installing PFC equipment, contact Energex or Ergon direct to find out more.
- RENPRO Solutions is listed on the Energex PFC Suppliers Register and the Ergon Trade Ally Network (TAN).
- RENPRO Solutions can Size, Supply and Install your PFC equipment for you.

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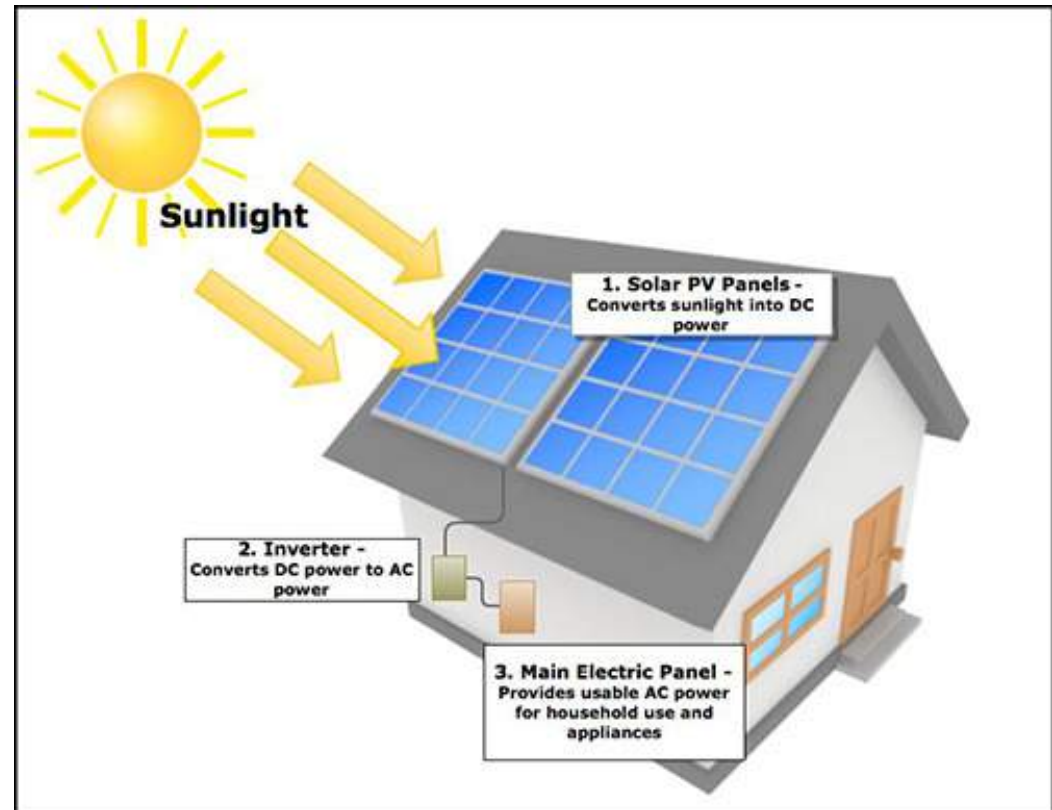
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# Solar PV

## How does it work?

- Solar panels convert direct sunlight into DC Power
- An inverter converts DC Power to AC Power for use
- Excess Power is fed into the grid when solar production exceeds use by the premises



# Solar PV

Why should I install it?



- Depending on the system size, Solar Power can be the biggest single reduction to your energy consumption costs that you can make
- Protection from future Energy Price Increases
- System Life of over 25 Years

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# Solar PV



What am I likely to save?

- Example – Company A installs a 50kW Solar PV System
  - Energy retailer agrees to a Feed In Tariff (FIT) of \$0.06/kWh

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## Estimated Performance - 24 Mar 2014



### Solar Panel Specifications

Panel watts Manufactures	250W
tolerance Voc	103%
Voltage / temp de-rating factor Power	37.5Volts
/ temp de-rating factor Vmp	-0.31%/K
Cable DC loss	-0.43%/K
Number of panels in string	30.8Volts
Number of strings	1%
Inverter Specifications	98.2%
	360Volts
	1000Volts
Efficiency	28600W
Min MPP Voltage Max	18%
input Voltage Max DC	24
Watts Cable AC loss	24.93
Installation Details	40.44
Average temp de-rating Max applied.	

### Location

Browns Plains Road	
Crestmead	0
QLD 4132	30
Azimuth/Orientation Tilt	less than 150mm above roof
Installation Type	100%
Percentage of full sun Jan	100%
Feb Mar	100%
Apr May	100%
Jun Jul	100%
Aug Sep	100%
Oct Nov	100%
Dec	100%
	100%
	100%

panels per string Minimum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
DC Voltage Maximum DC Voltage	6.64	6.58	6.69	6.31	5.97	5.39	5.83	6.50	7.08	6.89	6.72	6.42	6.42
Estimated Daily kWh production	130.22	129.07	131.99	125.53	120.40	109.89	119.19	132.16	142.30	137.56	133.35	126.38	128.17
Percentage of full sun	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Estimated Daily kWh production taking shading and all de-rating factors in to account	130.22	129.07	131.99	125.53	120.40	109.89	119.19	132.16	142.30	137.56	133.35	126.38	128.17

VERSION: Version 1 - 2012.

DECLARATION: These guidelines have been developed by Clean Energy Council. While all care has been taken to ensure this estimator is free from omission and error, no responsibility can be taken for the use of this information in the design/installation of any grid-connected power system.

# Solar PV

System Size	Day	Projected Daily kWh Production	Offset Energy Cost / kWh	Projected Daily Offset Savings	Projected Yearly Offset Savings
50	Weekday	256.34	\$0.25	\$64.09	\$16,663.40
System Size	Day	Projected Daily kWh Production	Feed In Tariff Rate	Projected Daily FIT Income	Projected Yearly FIT Income
50	Weekend	256.34	\$0.06	\$15.38	\$1,599.56
<b><u>Total Annual Savings</u></b>					<b><u>\$18,262.96</u></b>

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# Thank You!



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