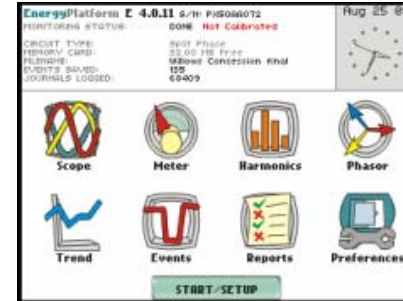




## **MAVOWATT 20 – Energy Platform**

Energy and Power Analyzer

# MAVOWATT 20 – The new Energy and Power Analyzer



Present Energy ..	Daily Energy Rat..	Monthly Energy ..
15:47:08 30.89 KW-s	Aug 25 09 609.25 W-hr	Aug 25 09 609.25 W-hr
Days Into Billing..	Daily Cost	Carbon Footprint
25 Days into 31 Day cycle	0.07 USD	319.25 lb CO2
RMS Voltage	RMS Current	Active Power
A 120.3 B 120.3 C 120.3	A 98.90 B 98.90 C 98.90	A 10.49K B 10.20K C 10.20K
Clear	Demand	Exit

Active Pwr Dmd	Predicted W Dmd	Dmd Interval Sta..
Tot 30.89K	Tot 30.89K	1 Min into the 1 Min interval
Daily Pk Dmd	Weekly Pk Dmd	Monthly Pk Dmd
Date: Jan 01 00 Time: 00:00:00 Dmd: 9584079.0 K	Date: Aug 25 09 Time: 15:58:00 Dmd: 30891.5 KW	Date: Aug 25 09 Time: 15:58:00 Dmd: 30891.5 KW
RMS Voltage	RMS Current	Active Power
A 120.3 B 120.3 C 120.3	A 98.90 B 98.90 C 98.90	A 10.49K B 10.20K C 10.20K
Clear	Energy	Exit

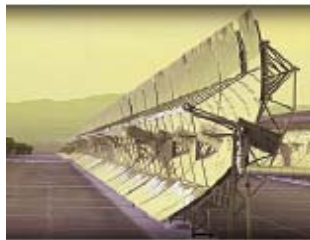
## Applications

- **Electrical energy reduction & cost savings programs**
  - How much energy is used? Where and when used? Daily, Weekly & Monthly KW/KWh
  - Determine energy costs
  - Determine electrical Carbon Footprint
- **Alternative energy such as wind and solar**
  - Monitor individual generators (panels, windmills) or total generation.
  - DC monitoring for solar applications.
  - Direction of energy flow. Producing or consuming electricity



# Applications

- **General power studies**
  - V, I, W, VA, VAR, PF, Demand, Energy + more
- **NEC 220.87 demand surveys**
- **Load testing, commissioning**
- **Harmonic studies**
- **Simple PQ studies**



## Key Features

- **Powerful, yet very affordable power monitoring!**
  - Better features and easier to use than competition but at a similar price
- **Lightweight portable instrument** – 3.8lb (1.8Kg)
- **Colorful user interface** – No PC software required
  - ¼ VGA color touch screen
- **Easy to read Energy & Demand reports**
- **Carbon Footprint Calculator**
- **EPRW software (no license) included**
  - DranView optional
  - New DranView energy audit report for use with complete MAVOWATT family

Present Energy .. 15:47:08 30.89 KW-s	Daily Energy Rat.. Aug 25 09 609.25 W-Hr	Monthly Energy .. Aug 25 09 609.25 W-Hr
Days Into Billing.. 25 Days into 31 Day cycle	Daily Cost 0.07 USD	Carbon Footprint 319.25 lb CO2
RMS Voltage A 120.3 B 120.3 C 120.3	RMS Current A 98.90 B 98.90 C 98.90	Active Power A 10.49K B 10.20K C 10.20K
Clear	Demand	Exit



### Key Features

- **Large Compact Flash memory** for long duration surveys
- **Automatic setup** – Easy beginning
  - No operational training required
  - Easy to use manual setups also available
- **High resolution**
  - 256 samples per cycle. 8 channels, 4V, 4I. Cycle by cycle accumulation with no gaps in measurements!
- **High accuracy**
  - 0.1% V&I (plus transducers)
- **Packages include all that you need!**
  - EP1, voltage cables, CT's, CF Card, Case, EPRW software
- **Additional accessories available**
  - DranFlex XL CT's, Clamp CT's, Enclosures + more
  - Compatible with MAVOWATT 30/40/70



## Overview



Single, Common Reference Inputs  
D Channel Differential  
600VAC, DC L-N, N-G



Rugged Plastic Enclosure  
Protective Rubber Boot  
¼ VGA, Color Touch Screen  
3.8 lb/1.8KG



Single CF slot  
Power Button  
Battery Charge Indicator



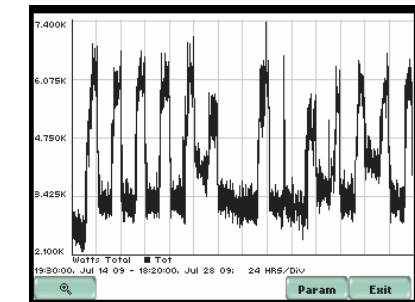
## Feature Set

- **Measured, Trended & Triggered Parameters**
  - **Very similar to MAVOWATT 30**
  - **Cycle by cycle V & I. 256 samples/cycle**
  - **CAT III 600V**
- **Power** – Trend min, max, ave
  - V, I, W, PF, DPF, TPF
- **Distortion** – Trend min, max, ave
  - Vthd, Ithd, VTID, ITID, TIF, TDF, K Factor
- **Demand**
  - Active, Apparent, Reactive Power Demand
- **Energy**
  - KWh, KVAh, KVARh, Forward & Reverse Energy

Standard \ Distortion \ Advanced			
Basic		Volts	Amps
Comp Basic	A	120.3	101.8
Power	B	120.3	101.8
Demand	C	120.3	101.8
Energy	D	4.985	4.999
Harmonics	A-B	209.3 *	
	B-C	209.3 *	
Adv Energy	C-A	206.3 *	

\* Derived values

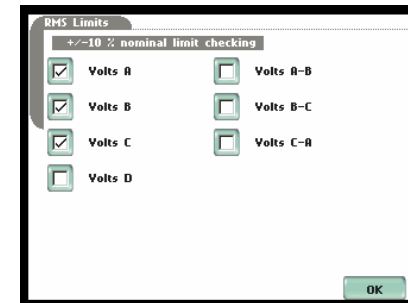
Standard \ Distortion \ Advanced					
Peak Power		Fwd Whr	Fwd VarHr	Rev Whr	Rev VarHr
Pred. Power	A	354.1	0	0	189.2
Adv Energy	B	344.3	0	0	204.9
	C	344.3	0	0	206.4
	D	0.817	0	0	<0.01
	Tot	1.043K	0	0	600.5





## Feature Set

- **Measured, Trended & Triggered Parameters**
  - **Journal trending and triggers work as MAVOWATT 30**
    - 200ms resolution on V, I, W, VA, VAR, THD, Harmonics and other parameters
  - **Voltage and Current Power Quality is available but limited**
    - Sag/Dip & Swell only
    - Cycle by cycle detection
    - No waveforms are available. Text summary of events only
    - Thresholds are fixed to +/- 10% of nominal automatically detected or manually entered.
    - Customer cannot change PQ limits. Can turn PQ triggers on and off
  - **Flicker is not available**



# Demand Report

Easy to read reports summarize your survey

- **Present Demand**
  - Present demand of the circuit
- **Predicted Demand**
- **Demand Interval Status**
  - Shows time into the demand interval such as 11 minutes into a 15 minute interval
- **Daily, Weekly & Monthly Peak Demand time/date**
  - Customers can be billed on peak demand
  - This report shows the date and time of the peak demand for the current day, week and month
- **Real Time V, I, W meter**
  - Present metered values
  - Same as meter screen

Active Pwr Dmd Tot 30.89K	Predicted W Dmd Tot 30.89K	Dmd Interval Sta.. 1 Min into the 1 Min interval
Daily Pk Dmd Date: Jan 01 00 Time: 00:00:00 Dmd: 9584079.0 K	Weekly Pk Dmd Date: Aug 25 09 Time: 15:58:00 Dmd: 30891.5 KW	Monthly Pk Dmd Date: Aug 25 09 Time: 15:58:00 Dmd: 30891.5 KW
RMS Voltage A 120.3 B 120.3 C 120.3	RMS Current A 98.90 B 98.90 C 98.90	Active Power A 10.49K B 10.20K C 10.20K
Clear	Energy	Exit



# Energy Report

- **Billing cycle status**
- **Daily & Monthly Energy**
  - Easily know how much energy is used.
- **Carbon Footprint calculator**
  - Carbon Footprint represents the Carbon Dioxide CO2 produced generating electricity consumed.
  - Various generation methods have different carbon footprints, i.e. coal, gas, oil, nuclear, hydro, wind, solar generation have a different impact on the environment. The lower the number, the less CO2 produced.
  - Usually represented in pounds/KWh or Kg of CO2 per KWh consumed
  - Can be an average representing all types of generation used by the utility.
  - Example: Pacific Gas & Electric (California, USA) publishes a Carbon Footprint of 0.524 pounds CO2 /KWh of energy used.
- **Real Time V, I, W meter**
  - Present metered values
  - Same as meter screen

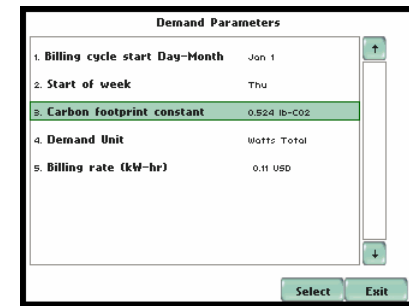
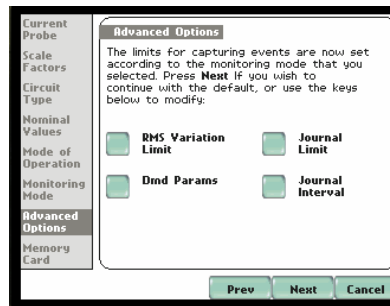
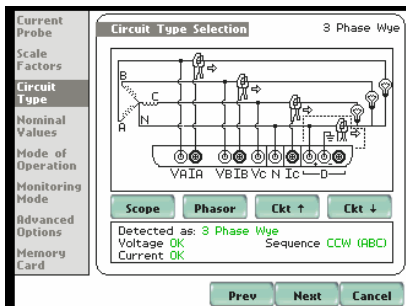
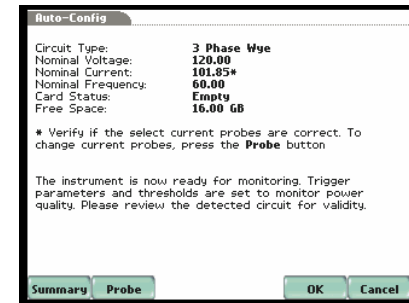
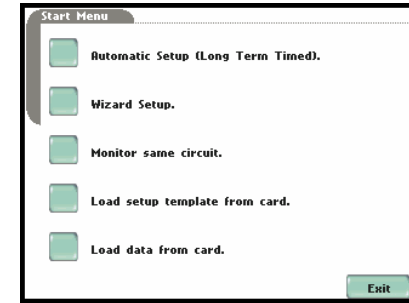
<b>Present Energy ..</b> 15:47:08 30.89 KW-s	<b>Daily Energy Rat..</b> Aug 25 09 609.25 W-Hr	<b>Monthly Energy ..</b> Aug 25 09 609.25 W-Hr
<b>Days Into Billing..</b> 25 Days into 31 Day cycle	<b>Daily Cost</b> 0.07 USD	<b>Carbon Footprint</b> 319.25 lb CO2
<b>RMS Voltage</b> A 120.3 B 120.3 C 120.3	<b>RMS Current</b> A 98.90 B 98.90 C 98.90	<b>Active Power</b> A 10.49K B 10.20K C 10.20K
Clear	Demand	Exit

<b>Carbon Footprint</b> 319.25 lb CO2
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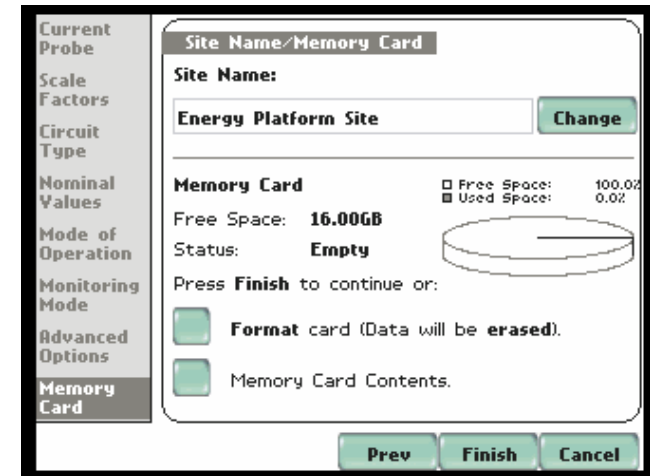
# Setups

- **Automatic setups**
  - Automatic detection of Circuit Type
  - Factory default settings
  - User can select probe type
- **Manual Setups – Wizard**
  - Customize recording and reporting parameters
    - Journal triggers – High/Low limits
    - Journal intervals – Demand interval, power & harmonics intervals
    - Demand unit – W, VA, VAR
    - Carbon Footprint – Pound or Kg, multiplier




## Setups

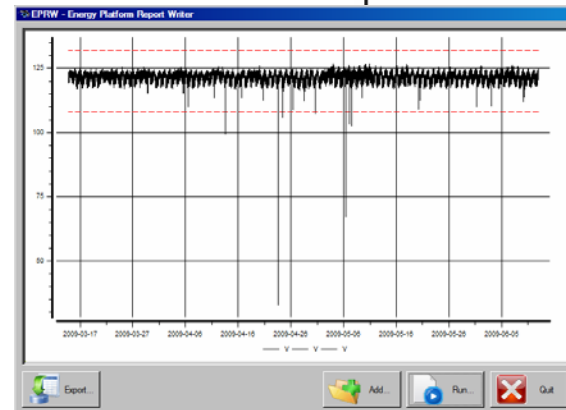
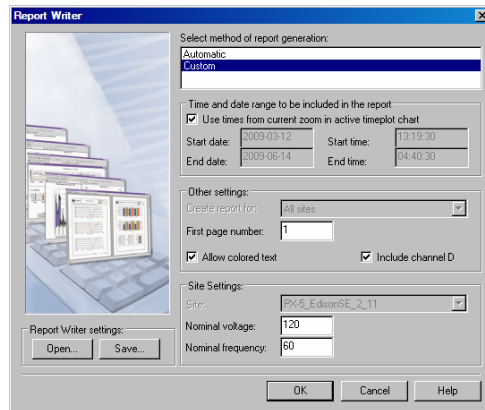
- **Compact Flash Data Storage**
  - 4GB (min) Compact Flash (CF) provided
  - Data and setups stored on CF card
  - Maximum file size is 256MB. Automatically starts a new file if fills during monitoring
  - CF Card is used to load data into the PC and for EPRW, DranView
    - Standard CF card reader used. USB, built into laptop, etc.
- **MAVOWATT 20 has the largest data storage of any manufacturer**



# EPRW PC Software

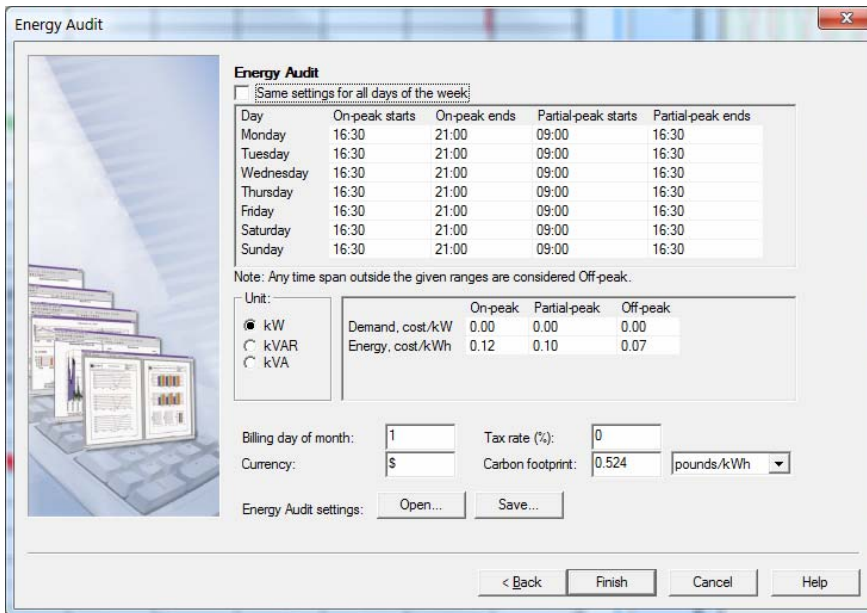
- **Energy Platform Report Writer Software**
  - Included in package at no additional cost
  - Unlicensed – No HASP
  - Automatically produces an energy audit report in an RTF format
    - User selects time range of report
    - Includes Energy expense summary
    - Time Of Use Billing, Trended data
  - Export data to .CSV files for use in other software such as Excel

	PX_5_EdisonSE_2_11	Date	2009-06-27 Page 1	
		Issued by		
		Filename	PX-5_EdisonSE_2_11_05	
<b>Demand and Energy Summary Report</b> Site: PX-5_EdisonSE_2_11 Measured from 2009-03-12 13:19:30,0 to 2009-06-14 04:40:30,0 BILLING DAY OF MONTH: 25				
DEMAND and ENERGY REPORT				
DEMAND				
	ON-PEAK (kW)	PARTIAL-PEAK (kW)	OFF-PEAK (kW)	MIN PF
Mar (*)	160.5	0.0	135.7	0.908
Apr	196.1	0.0	144.7	0.905
May	221.2	0.0	163.6	0.902
Jun (*)	196.9	0.0	169.2	0.890
Max values	221.2	0.0	169.2	0.898
ENERGY CONSUMPTION				
	ON-PEAK (kWh)	PARTIAL-PEAK (kWh)	OFF-PEAK (kWh)	CARBON FOOTPRINT (tons)
Mar (*)	10606.7	0.0	7168.5	8.89
Apr	33082.8	0.0	22074.3	27.58
May	36401.0	0.0	21766.5	29.08
Jun (*)	22783.9	0.0	13009.3	17.93
Total values	102874.3	0.0	64078.6	83.48
(*) Indicates partial month.				



# DranView PC Software

- Optionally available for use with MAVOWATT 20
- New driver to read MAVOWATT 20 data
- New Energy Audit report added to the DV report writer
  - Energy Audit report is similar to EPRW reporting features
  - Demand & Time Of Use reports



**Time of Use Billing**  
 Site: Willows Concession final  
 Measured from 07/14/2009 11:12:09.0 to 07/29/2009 02:37:01.0  
 BILLING DAY OF MONTH: 1

TIME OF USE COSTS

DEMAND			
	ON-PEAK (\$)	PARTIAL-PEAK (\$)	OFF-PEAK (\$)
Jul (*)	0.0	0.0	0.0

ENERGY CONSUMPTION			
	ON-PEAK (\$)	PARTIAL-PEAK (\$)	OFF-PEAK (\$)
Jul (*)	36.6	50.4	39.7
Total values	36.6	50.4	39.7

(\*) Indicates partial month.



## Differentiation MAVOWATT Family

<i>Application/Feature</i>	<i>MAVOWATT</i>	<i>MAVOWATT</i>	<i>MAVOWATT</i>	<i>MAVOWATT</i>
	<i>20</i>	<i>30</i>	<i>40</i>	<i>70</i>
<b>Power Quality Testing (IEC61000-4-30 Class A, IEEE1159)</b>		X	X	X
<b>Energy/Load Surveys &amp; Studies</b>	X	X	X	X
<b>Advanced Load Distortion and Imbalance</b>				X
<b>400 HZ Measurements</b>				<b>MW 70 - 400</b>
<b>Fault Recording / In-Rush</b>			X	X
<b>Motor Testing</b>		X	X	X
<b>Data Logging</b>	X	X	X	X
<b>Harmonic Analysis to 63<sup>rd</sup> (IEC61000-4-7, IEEE519)</b>	X	X	X	X
<b>Flicker per IEC61000-4-15, IEEE1453</b>		X	X	X
<b>High Speed Transient Capture</b>				X
<b>AnswerModules (motor health, cap switch, sag)</b>			X	X
<b>Measurement Inputs</b>	<b>Common Reference</b>	<b>Differential</b>	<b>Differential</b>	<b>Differential</b>
<b>Demand &amp; Energy Reports</b>	X			
<b>Monitoring Modes</b>	2	4	7	7
<b>Pre/Fault/Post Cycles</b>	0	100	10.000	10.000
<b>Languages</b>	11	11	11	11





*Thank you for your attention!*

*If you have any further questions or suggestions, please contact:*

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