

# SolarVu™ Installation Guide for Fronius IG Plus Adv and Data Manager 2

## Introduction

SolarVu™ is an energy portal that enables remote monitoring of renewable energy generation sites over the internet. It requires the installation of a SolarVu gateway which continuously transfers data from the inverters to the remote SolarVu servers. This guide explains how to connect the SolarVu gateway to Fronius IG Plus inverters. To make SolarVu system work, several steps are required:

- 1) Connect the SolarVu gateway to the inverters
- 2) Connect the SolarVu gateway to the building LAN for internet access
- 3) Enter the communications settings into each inverter
- 4) Access SolarVu from a browser and configure the energy portal

## Site Preparation

To access SolarVu from a browser, the inverters communicate serially with a Cachelan SolarVu gateway connected to the site network as shown in fig 1. The first inverter in the group must have the original Comm card (RS422 card) replaced and installed with Fronius Data Manager 2 (DM2) P/N# 4,240,034,Z. The rest of the inverters are required to have the default Comm card (RS422 card) remain unchanged. The SolarVu gateway connects to the first inverter over RS485 using twisted pair wire, typically using Cat5e cables. Connect ethernet cable from the SolarNet IN port on the DM2 to the OUT port on the 2<sup>nd</sup> inverter. Connect another ethernet cable from the IN port on the 2<sup>nd</sup> inverter to the OUT port on the 3<sup>rd</sup> inverter and etc. Finally, plug in the link plug to the IN port on the last inverter.

The LAN must have high speed internet service to an ISP to provide access to the internet. The SolarVu gateway RJ45 ethernet jack plugs into an RJ45 LAN jack connected to the building router using a standard Cat5e patch cable. Alternatively, SolarVu can be ordered with a 3G cellular modem for wireless internet connection. A source of 120VAC for control power needs to be connected to the SolarVu enclosure.

## SolarVu Gateway Installation

**Power Supply:** Connect from a 120VAC source to the breaker (terminal L), terminal N and GND inside SolarVu enclosure as shown in fig 2.

**RS485 Serial:** Connect the RS485 serial Cat5e cable to the gateway terminals as shown in fig 4 being careful to match the correct wire colour to the terminals. Recommended cable type is Cat5e, 8 wire, UTP, #24 solid. Twisted pair must be used for the RS485 serial data wires. Use a tie wrap to provide strain relief for the Cat5e cable. The ground wire should be connected to an external ground to provide a path for transient protection. Connect the other end of the serial cable to the first inverter with the DM2 card installed as shown in fig 4. Over 1000 feet of wire can be used for reliable serial communications.

**Ethernet:** Use a standard ethernet patch cable with RJ45 plug on each end of the appropriate length to connect from the RJ45 ethernet jack on the gateway to the network ethernet at a RJ45 wall jack or router/switch. This is usually a auto IP assignment using DHCP from a small sites but a larger commercial organization may require static IP settings specified by the IT system administrator. This should be specified at time of order. Settings as shipped can be verified from the SolarVu configuration sheet included in the enclosure document pouch. Alternatively, SolarVu can be ordered with a 3G cellular modem/router installed for wireless connection. This requires installation of a customer supplied SIM card with an active telco account for service

Fig 1 Internal connection for 10kW inverters

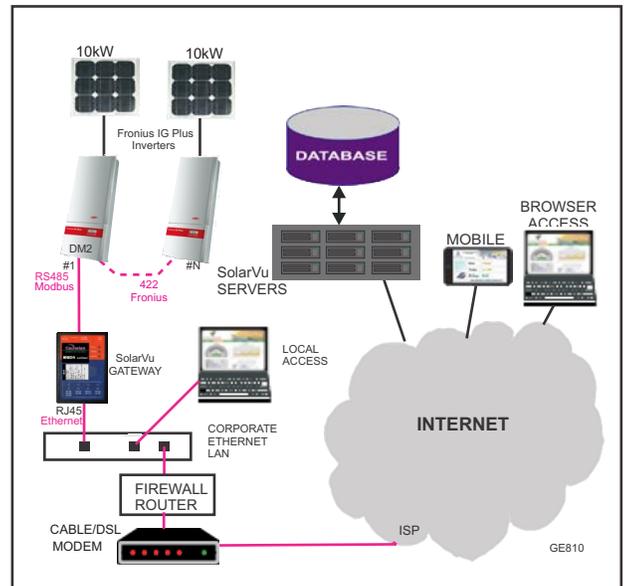
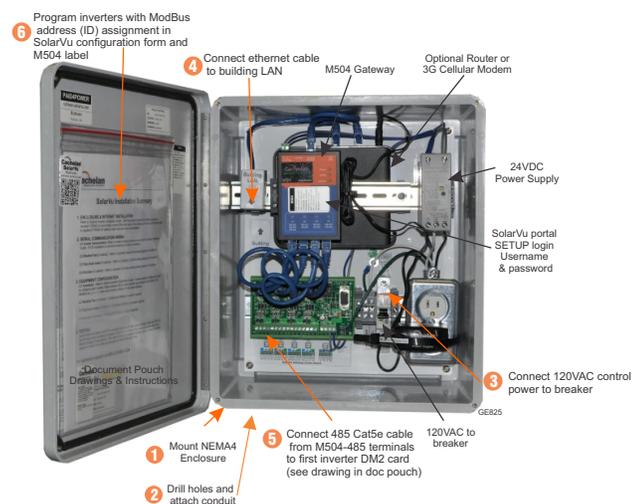


Fig 2 SolarVu enclosure - for M504 gateway



**For multiple inverters connection**

Refer to Fig 3 and Fig 4.1 for detailed wiring connections. Remove the existing Comm card in the first inverter and install DM2 card. The existing Comm card and DM2 cannot be co-existing. Connect the RS485 terminals (D+ and D-) from the first inverter with the DM2 installed to SolarVu Comm board typically on port 1 (terminal 1 for D+ and 2 for D-), refer to the corresponding Cachelan SLD of each project for detailed port assignment.

**For single inverter connection**

If only one inverter, refer to Fig 3 and Fig 4.2 for detailed wiring connections. Remove the existing Comm card in the first inverter and install DM2 card. The existing Comm card and DM2 cannot be co-existing. The link plugs supplied with the inverter must be inserted in "SolarNet IN" jack on DM2 card in inverter #1 for communication to work.

Fig 3 Fronius DM2 card installation

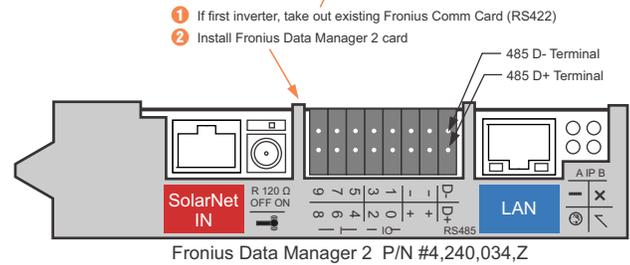
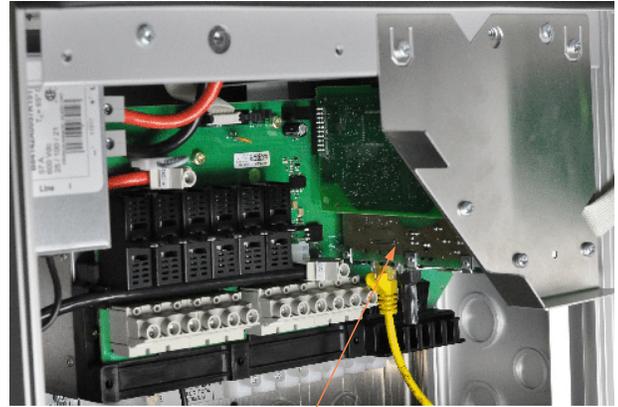


Fig 4.1 SolarVu to N Inverter connection diagram

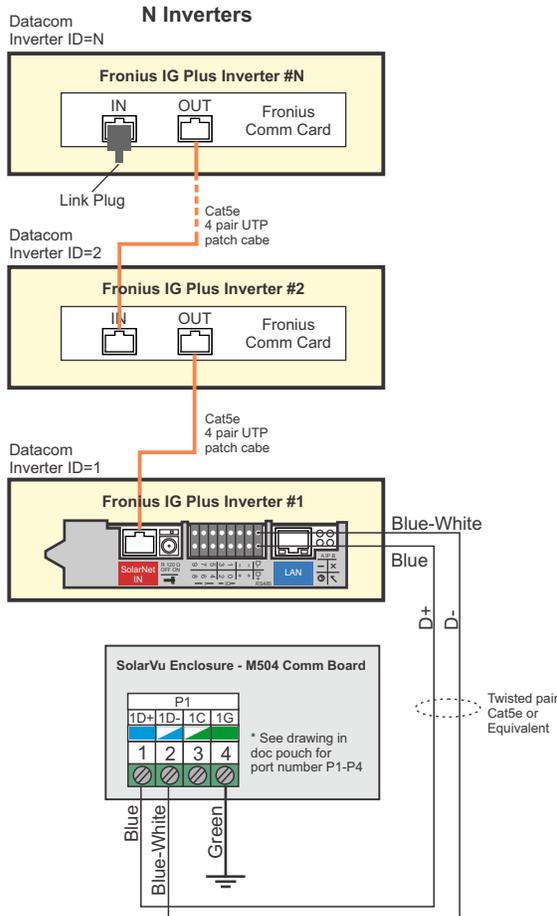
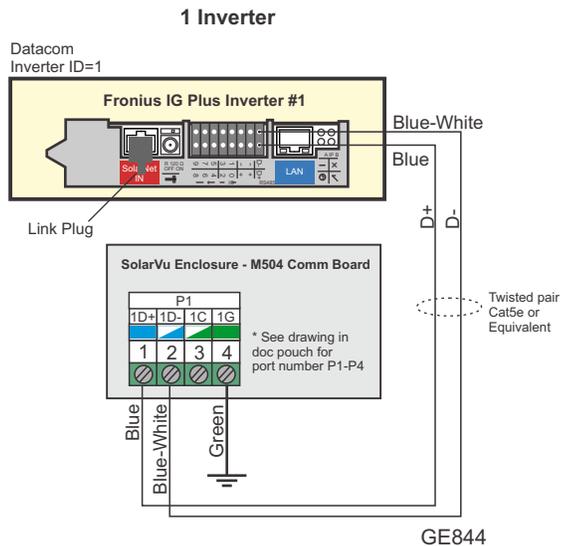


Fig 4.2 SolarVu to 1 Inverter connection diagram



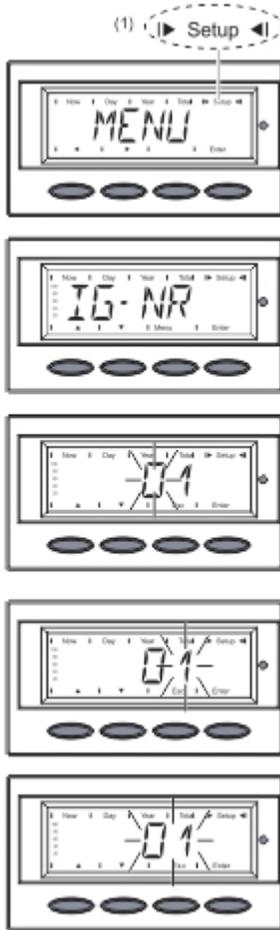
# Inverter Protocol Settings

Each inverter must be configured with a unique address (ID) and the correct communication protocol using the front panels keys and display. Required inverter ID settings are found in the SolarVu enclosure document pouch on the door and are normally assigned as 1, 2, 3... Follow the sequence in Fig 5 for entering the settings for each inverter individually.

Note that the baud rate on each inverter are left as default at 2400 and the baud rate on the DM2 is fixed at 9600

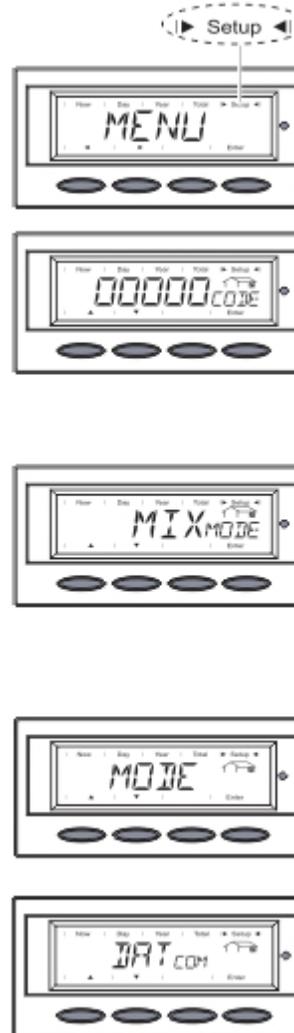
Fig 5 Fronius IG Plus inverter communication address and

## Setting the inverter ID



1. Switch to the menu level (press the 'Menu' key)
2. Select the 'Setup' (1) mode using the 'Left' or 'Right' keys
3. Press the 'Enter' key  
- 'Stand<sub>by</sub>' is displayed
4. Select the 'IG-NR' menu item using the 'Up' and 'Down' keys
5. Press the 'Enter' key  
▲ ▼
6. Use the 'Up' and 'Down' keys to select a value for the first digit  
▲ ▼
7. Press the 'Enter' key  
- The inverter number is shown, the first digit flashes.
8. Use the 'Up' and 'Down' keys to select a value for the second digit  
▲ ▼
9. Press the 'Enter' key  
- The second digit flashes
10. Press the 'Enter' key  
- The set inverter number flashes
11. Press the 'Esc' key to exit the 'IG-Nr' menu option

## Setting the protocol



1. Switch to the menu level (press the 'Menu' key)
2. Select the 'Setup' (1) mode using the 'Left' or 'Right' keys  
◀ ▶
3. Press the 'Enter' key  
- 'Stand<sub>by</sub>' is displayed
4. Immediately press the 'Menu' key five times  
- „00000<sub>CODE</sub>” is displayed
5. Use the 'Up' and 'Down' keys to change the flashing number  
▲ ▼
6. Confirm the number using the 'Enter' key
7. Enter code 22742
8. After entering all numbers, press the 'Enter' key  
- Display flashes
9. Press the 'Enter' key again  
- 'MIX<sub>Mode</sub>' is displayed
10. Use the 'Up' and 'Down' keys to select 'COMM'  
▲ ▼
11. Confirm using the 'Enter' key  
- 'MODE' is displayed
12. Confirm using the 'Enter' key
13. Use the 'Up' and 'Down' keys to select 'Dat com' (do not select IFP)  
▲ ▼
14. Confirm using the 'Enter' key  
- The protocol type has been changed  
- 'MODE' is displayed

After clicking Enter, with MODE displayed, access the protocol screen again and verify that DATcom was saved

## Testing the System

At this point the installation should be complete ready for testing. It is helpful to have access to a PC that is connected to the internet for viewing SolarVu screens. Using the URL supplied for the system. The gateway is preconfigured to automatically send inverter data to the SolarVu servers. To do this it must first establish an internet connection. Then it will collect data from the inverters and periodically transmit it.

Verifying correct operation is described in the sections that follow. Indicator lights and actual values accessible from the SolarVu Analyzer > Inverter Status screen Fig 6 are useful for determining the status of the system.

Fig 6 Use the ANALYZER > Inverter Status screen to check system status

To access the inverter status screen, enter the SolarVu URL in your browser  
Click ANALYZER

**Cachelan SMART GRID ENERGY**

**SolarVu ENERGY PORTAL**

SITE LIVE **ANALYZER** SETUP SUPPORT HOME

Inverter Status ▾ HELP

Time of last update received from the M504 gateway → Monday, February 8, 2016 11:51:04 AM (GMT -5:00)

**Fronius IG Plus V #1 ( Device ID : 1 )** Installation

Power Now <b>5,768</b> W	<b>DC Input</b>	Power	<b>6,006 W</b>	Voltage	<b>308 V</b>	Current	<b>19.5 A</b>	
	<b>AC Output</b>	Power	<b>5,768 W</b>	Voltage	<b>217 V</b>	Current	<b>26.8 A</b>	
Lifetime Energy <b>806</b> kWh	<b>Phase</b>	Efficiency	<b>96%</b>	Frequency	<b>60.0 Hz</b>			
		Current A	<b>13.2 A</b>	Current B	<b>13.3 A</b>	Current C	<b>0.4 A</b>	
		Voltage A-B	<b>217 V</b>	Voltage B-C	<b>218 V</b>	Voltage C-A	<b>216 V</b>	
<b>Inverter</b>		<b>Fronius IG Plus V/11.4-3 Delta</b>				Comm	<b>DM2 Modbus</b>	
<b>Status</b>		<b>Normal operation</b>						

Update

Listen  Last Data Updated: **Feb 8, 2016, Mon 11:45 AM (GMT -5:00)**

Listen  Last Communication: **Feb 8, 2016, Mon 11:45 AM (GMT -5:00)**

Alarms and status reported by inverter

Light is green if M504 gateway is reading valid data from the inverter over RS485. M504 must be connected to the internet.

Light goes green if M504 is connected to the internet

Time of last communication. M504 sends an update every 10 minutes

# Network Setup

On power up, the gateway looks for a DHCP server to provide it a dynamic IP address. If a PC connected to the network can automatically connect to the internet through a browser then the network is already configured to accept the gateway. If a dedicated IP address was programmed instead, subnet mask and DNS server address are required. This needs to be entered into the gateway before shipment. Network configuration is shown on the gateway label and the Configuration Settings page in the doc pouch. Once the gateway receives its IP address it acts as a client. It will automatically try to connect to the SolarVu server and begin transferring data from the inverter to the server.

Fig 7 M504 Gateway Indicators

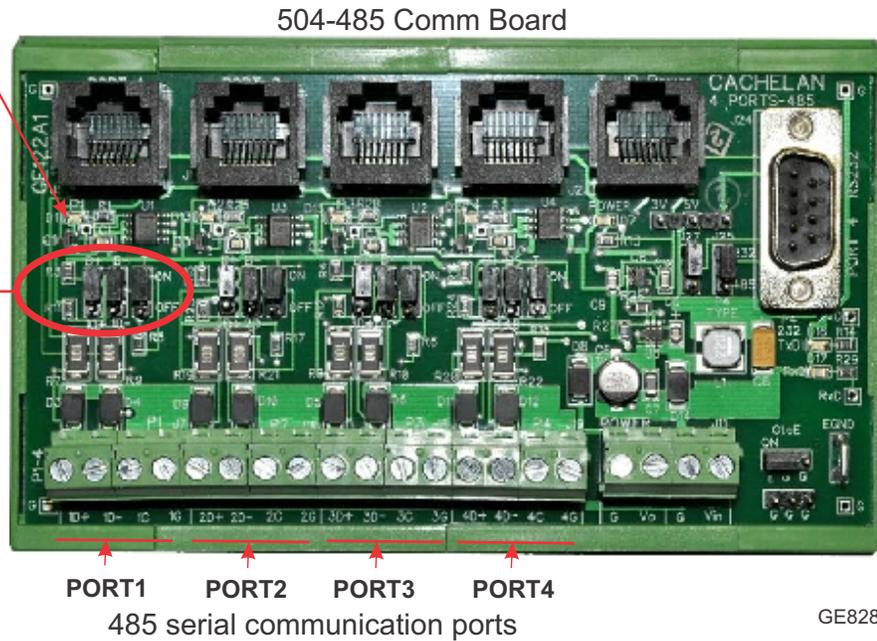
Blue data LED flashes when transmitting and receiving data from the inverter

**JUMPER SETTINGS**  
Terminator Resistor + Biasing

B+ Bias high = ON  
B- Bias low = ON  
T 120R termination = ON

B+	B-	T	
ON	ON	ON	ON
OFF	OFF	OFF	OFF

Inverter is normally connected to PORT1.  
See SLD drawing in doc pouch for details



GE828



INDICATOR STATUS		
LED	NORMAL	STATUS
Power	●	OFF-no power ON-power OK
Ready	●	ON M504 booted up and running
Link/Act	●	OFF-no ethernet connection FLASH- data traffic activity
P1	●	Serial Port 1 usually inverter Transmit=orange, Receive=green, flashing
P2	●	Serial Port 2 usually option Transmit=orange, Receive=green, flashing
P3	●	Serial Port 3 usually option Transmit=orange, Receive=green, flashing
P4	●	Serial Port 4 usually option Transmit=orange, Receive=green, flashing

TROUBLESHOOTING CHECKLIST	
<b>IP Address</b>	Obtain IP by DHCP or set static IP Network must be configured to same settings
<b>Serial</b>	Check inverter connected to correct port. Polarity of serial twisted pair wires. Serial ID entered correctly in each inverter
<b>Inverter</b>	Powered on. Serial ID has been set to match SLD drawing. Serial wiring correct.
<b>Internet</b>	Internet connection for ISP to LAN working
<b>Support</b>	For Cachelan technical support 905.470.8400 x224 contactus@cachelan.com

GE829

## Video Tour

For an overview of available features, visit [www.solarvu.net](http://www.solarvu.net) and play the What is SolarVu video. Each screen has a HELP button that explains how all the features work. An online help guide is available for printing under SETUP > DOWNLOADS > PRINTED HELP.

Visit [www.solarvu.net](http://www.solarvu.net) for a features video



Help guide



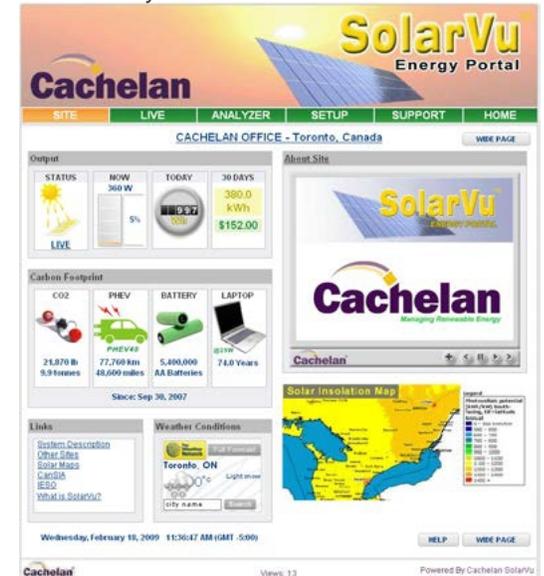
## Site Screen

For a summary of information about the site, click the SITE menu button. On the upper left, the current charging status of the solar panels, total power being generated now and in the last 30 days is displayed. Underneath, the carbon footprint of energy equivalents is displayed since startup. Links to other websites can be left as defaults or changed in SETUP to personal preferences. The local weather is preset. Email [contactus@cachelan.com](mailto:contactus@cachelan.com) to have it changed. For viewing on a widescreen TV suitable for display in a public place, click the WIDE PAGE button. On the right is a slideshow for public viewing. Content can be personalized using uploaded graphics in SETUP.

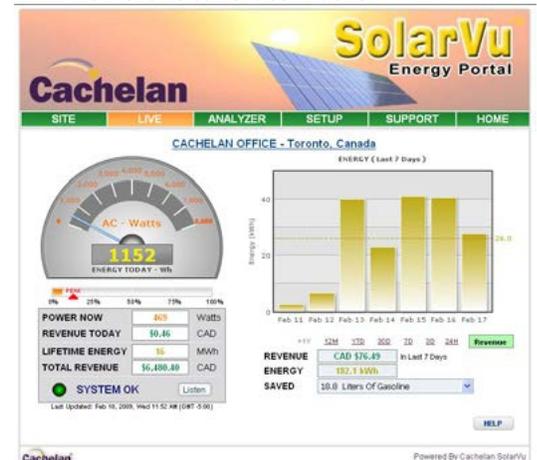


Select wide screen view for public display on an HDTV

Site Summary Screen



LIVE view shows current conditions



## Live Data

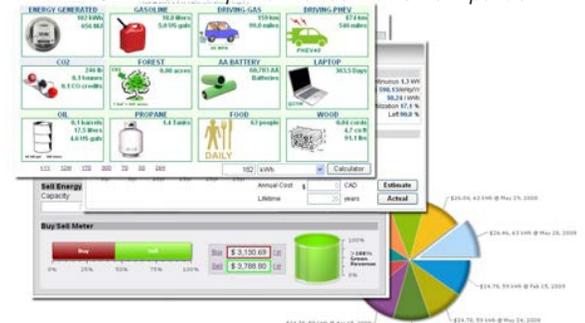
Click the LIVE menu button to display current power being generated in the array. Actual power and energy generated today are shown on the meter dial. For a normally operating system, the status indicator should be green with the last update time less than 15 minutes ago. Lifetime energy and revenue are shown digitally. For correct revenue display, the sell price per kWh must be entered in SETUP. If connection to the site is lost, or if an alarm is detected, the status indicator will be red. Click the Listen button with sound on for more information.

Trends are shown for the lifetime of the system using the graphs on the right. Select either an Energy or Revenue view using the button. Click the desired time period under the graph. Scroll over a data point with the mouse for more detailed information about that day. The carbon footprint pulldown gives energy equivalents for the solar power generated for the selected time period.

## Analyzer - Performance

Click the ANALYZER menu button and select a category in the pulldown menu and a time period under the graph. The carbon footprint will compute the energy equivalents to the solar energy generated over the selected time period. This helps visitors get a practical feel for the benefits available. To find the carbon equivalent for an arbitrary value, override the actual solar amount by entering a kWh value and selecting a category, then click the Calculator button. Other views including buy/sell energy use, performance and payback can be selected with in the pulldown menu. The screen will return to the last value selected on return.

ANALYSER - select performance views from pulldown



## Analyzer - Troubleshooting

When problems occur with the system or to check inverter operation, click ANALYZER > INVERTER STATUS. Each inverter connected to the system with a gateway will have its own display panel showing actual values sent. Remotely located technical personnel can assist in interpreting what the values are conveying. If no communication has been received from the device for more than 2 hours a No Data Available message will be shown

For detailed analysis, it may be helpful to download all readings for the time period of interest into a spreadsheet for further analysis using SETUP > DOWNLOAD.



Download printable HELP guide or actual readings for any time period

## Setup

For entering settings to configure your site, click the SETUP menu button. Enter your unique username and password from the account label. The setup screen appears showing communication status and current preference settings. Check the last communication time ①. It should show a time within the last 15 minutes if communication between the site and SolarVu™ server is working normally.

For the payback and revenue calculators to work properly, correct parameters for energy sell rate, capacity, average insolation etc should be entered. Account > Equipment Setup is for factory use. All changes take immediate effect. The Site Setup tab is used to customize the banner, links, slideshow and system description. Click the Help ② button for each section for a description of the effect for each entry. For further analysis, individual energy readings for any time period can be downloaded into a spreadsheet from the DOWNLOAD section.

Enter the email address ③ for each individual that wants a regular status report sent to them and select the frequency. This report will include energy and revenues for different time periods and indicate if there are any alarms. In the Password tab, include an email address to receive the Setup login password if this is forgotten.



## Support

See the What is SolarVu? video at www.solarvu.net for a feature overview. Each screen has a HELP button with details for the items on that view. A printable HELP guide can be downloaded in SETUP > DOWNLOAD.

For additional technical support, send an email to contactus@cachelan.com or dial our support line in Toronto, Canada at 905.470.8400

Click ANALYZER > INVERTER STATUS for troubleshooting

Lifetime Energy <b>1,800</b> Whr	<b>AC Output</b>	Power: <b>0 W</b>	Vrms (L1-L2): <b>217 V</b>	Current: <b>0.0 A</b>
		Vrms (L1-N): <b>125 V</b>	Vrms (L2-N): <b>132 V</b>	Frequency: <b>60.0 Hz</b>
	<b>DC Input</b>	Power: <b>33 W</b>	Volts: <b>349 V</b>	Current: <b>0.1 A</b>
	<b>Performance</b>	Power Efficiency: <b>0 %</b>	Heatsink Temp.: <b>29 °C</b>	
AC Output Power <b>0</b> W		Today On-Grid: <b>2.2 Hrs</b>	Lifetime: <b>13.5 Hrs</b>	Relay Cycle: <b>36</b>
	<b>Lifetime</b>	DC Input: <b>2,700 Whr</b>	AC Output: <b>1,800 Whr</b>	Efficiency: <b>67 %</b>
	<b>Inverter</b>	Model: <b>PVI 5000</b> S/N: <b>10010663</b>	RS485 Address: <b>15</b>	
PV Input Power <b>33</b> W		Hardware Ver.: <b>65</b>	DSP1 Ver.: <b>1.40</b>	DSP2 Ver.: <b>1.18</b>
	<b>Status</b>	<b>Fault mode</b> Vact1 - The AC voltage of mains utility is over the upper limit Vact2 - The AC voltage of mains utility is under the lower limit COMN - External communication failed warning message Vact2 N - The voltage between L2 and neutral is exceeding the upper limit		

See gateway label for SETUP login

**Customer Login**

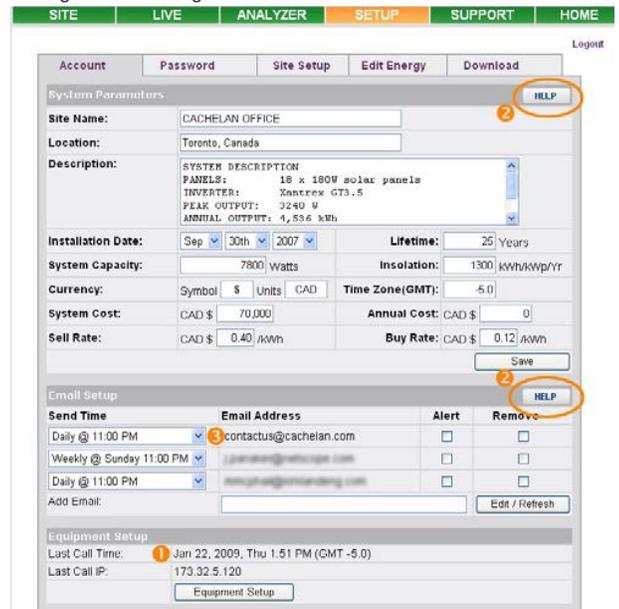
Username  
myusername

Password  
mypassword

[Forgot your password?](#)

<b>K135 GATEWAY</b>	
URL:	mysite.solarvu.net
USER:	myusername
PASSWORD:	mypassword
IP:	DHCP
MAC:	00-01-95-06-E8-33
ID:	SS100 070300075 v1.4.1
TYPE:	
DATE:	Feb 2009
SUPPORT:	cachelan.com

Configure site settings in SETUP



**Cachelan Technical Support**  
**contactus@cachelan.com**  
**905.470.8400 x224**