

### APPLICATIONS

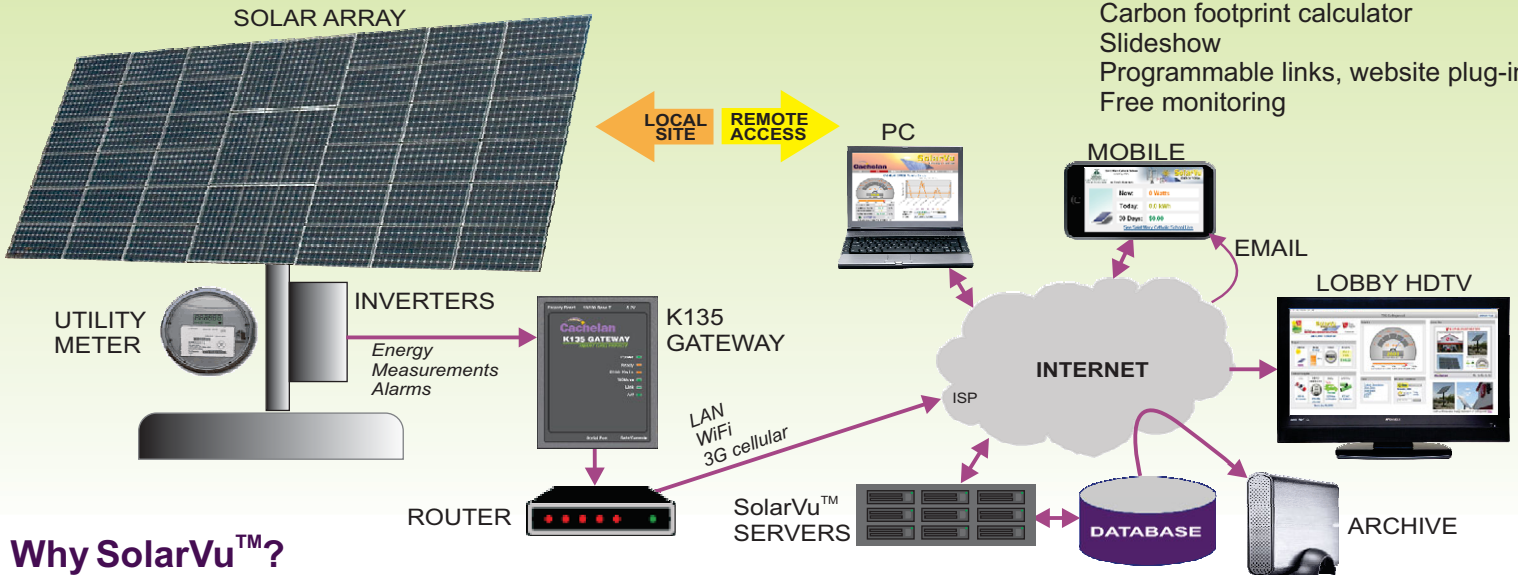
- Solar PV - rooftop, fixed ground, tracker
- Residential, microFIT, commercial
- Public relations, website & lobby displays
- Lessons, experiments for schools
- Enterprise for managing multiple sites

### USES

- Fault notification minimizes downtime
- Power, energy, revenue, status
- Performance analysis - maximize output
- Check utility payments
- Payback calculator for ROI

### FEATURES

- Daily report email
- Browser access, no software to install
- Download data for archiving
- Carbon footprint calculator
- Slideshow
- Programmable links, website plug-ins
- Free monitoring

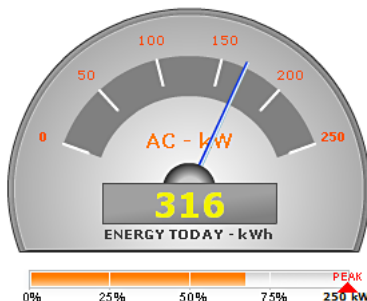


### Why SolarVu™?

A solar PV generating system is a big investment that only provides revenue when it is generating electricity. SolarVu™ is a web energy portal that builds a lifetime database of the solar array performance then uses simple graphics to display live power, energy, status and trends on your PC or mobile device. Receive a daily email report of revenues earned from your solar generation system. Get an alarm message if problems occur. Remotely view live inverter measurements to speed up troubleshooting. Check your carbon footprint reduction and learn about energy equivalents. Calculate expected ROI with the payback calculator before installation then compare to actual results after startup.

### Isn't a kWh Meter Enough?

Unless you regularly read the utility energy meter and manually plot the output, it will be difficult to determine how well the system is working. If a problem occurs, the first indication of lost revenue may be a low utility payment, months later. By communicating over the internet through your computer or mobile device, you will always know how your system is performing. Get a good understanding of solar energy while ensuring maximum return on your IPP (independent power producer) investment.

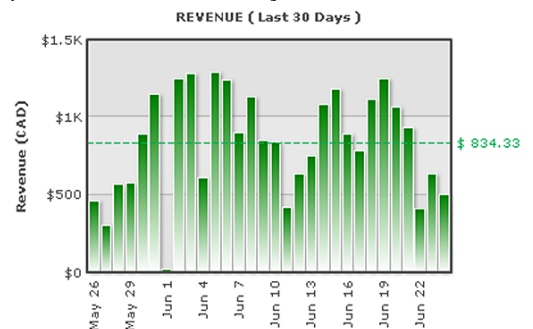


### Installing SolarVu™

A K135 gateway which connects to most popular inverters, is installed at the site. Internet connection is by wired LAN, WiFi or 3G cellular when no internet is locally available. Data is continuously sent to the remote SolarVu™ servers which build a lifetime database of the installation. A unique web address is provided for each site. Access is from a PC browser or mobile device. No software is required. Connection to the SolarVu™ web portal is free with initial purchase of the SolarVu™ energy portal.

### Check Revenues Every Day

Receive an email of your daily, weekly and lifetime revenues each evening. Visit the energy portal any time for detailed analysis of performance or to analyze faults.



## Maximize Return on Investment

Check performance and quickly identify faults that could result in lost revenues. Verify correct utility payments. A daily email summarizes performance and maintenance alarms. Track returns with the payback calculator.

### Capacity Gage

NOW 6,076 W  
10 kW  
61%

### Inverter Status

Daily Email - SMA SunnyBoy 55000US#1

AC OUTPUT: 5,409 W (14.1kWh) 251 V Current 20.4 A  
DC Input: 122 W (14.1kWh) 126 V (Maximum) 92.9 A  
Performance: Power Efficiency 94.5% Temperature 52°C Max Temperature 70°C  
Run: On Time 808.4 h Total Time 815.9 h Fan Voltage 0 V  
Settings: Grid Type 240V/Phase Mfg. Part Number 377 V  
Inverter: Inverter Address 1 Serial Number 2901433057  
Events: Event Count 10 Alarm On 147  
Status: Error Code - Balance OK Backup State

### Payback Calculator

Payback	Revenue
RETURN	234.1% total, 0.6% annual
LIFETIME REVENUE	CAD \$610,660.89
NET INVEST	CAD \$358,060.89

### Daily Email Report

SolarVu Energy Portal Output Report

SITE Name: Region of Waterloo Innovation Centre  
Address: 7601 Kitchener Rd, Waterloo, ON N2H 2K9  
Date: Saturday Jun 25, 2011 3PM

TODAY: 342.8 kWh \$244.45 1.93%

REVENUE: 342.8 kWh \$244.45  
ENERGY: 342.8 kWh \$244.45  
Last 7 days: 14,347.37 kWh \$10,353.24  
Last 30 days: 44,507.62 kWh \$32,011.62

## Communicate Corporate Values

Show customers how your business uses green energy for sustainability with a lobby display. Update the slideshow using the included WebFilm® content management system. Insert a live plug-in on your company website. Program links to related content.

### HDTV Display for Public Areas

### Slideshow & Video

### Programmable Links

- System Description
- Solar Maps
- What is SolarVu?
- Is it Worth It?
- Honest PV info
- Contact Owner

### Live Plugin for Owner's Website

SolarVu See Evergreen Energy Solutions - 1 LIVE

STATUS: NOW 3,342 W (10 kW) 33%  
TODAY: 2,264 kWh \$1,816  
30 DAYS: 3,056 lb CO2

## Learn about Solar Energy

Online lessons with experiments are available for teaching renewable energy in schools. SolarVu™ WebLab™ guides students in analyzing performance of their school's solar PV system for projects.

View lessons and experiments on screen, download printable PDF documents, watch videos

### LESSONS & EXPERIMENTS

1. Photovoltaic Cell
2. Series & Parallel
3. Storing Energy
4. True South
5. Solar Energy
6. Solar Geometry
7. Temp / Voltage
8. Temp / Voltage
9. Temp / Voltage

### VIDEOS

- How Solar Cells Work
- Electricity and Circuits
- Hydrogen and Solar Energy
- Polaris and Ursa Major
- Measure Energy from the Sun
- Solar Energy Concentrator
- Introduction to Solar 101

Use the carbon footprint calculator to determine equivalent savings of common fossil fuel sources from the solar energy generated

### CARBON FOOTPRINT (Year To Date: Jan 01, 2011 to Jun 25, 2011)

ENERGY GENERATED	GASOLINE	DRIVING-GAS	DRIVING-PHEV
76,081 kWh / 273,392 MJ	7,843 liters / 2,072 US gals	66,544 km / 41,340 miles	365,190 km / 228,244 miles

CO2	FOREST	AA BATTERY	LAPTOP
102,710 lbs / 46,400 credits	5,579 acres	25,360,396 AA Batteries	347.4 Years

OIL	PROPANE	FOOD	WOOD
45.9 barrels / 1,927 US gals	604 Tanks	26,235 people	18.2 cords / 1,948 cu ft / 38,041 lbs

DAILY: 76081 kWh / Calculator

250kW SolarVu™ monitored rooftop

## Manage Many Sites

Compare and manage multiple sites from a single screen with SolarVu™ Enterprise. Create and print reports for any time period. Download lifetime daily energy for spreadsheet analysis.

### Green Schools Solar 101

See alarm status and compare output of multiple sites

Performance	Maintenance	Report
GROUP: All	PROFILE: Power & Energy	PERIOD: Life Time
GROUP: All	NAME: Views	Output: kWh/View
GROUP: All	SAVINGS: Cents/lb	Output: %/Site Map
GROUP: All	SELL ENERGY: \$/MWh	Output: New % Capacity
GROUP: All	SELL POWER: \$/W	Output: New %

GROUP	Station	Name	Views	Savings Cents/lb	Output kWh/View	Output %/Site Map	Sell Energy \$/MWh	Output New % Capacity	Sell Power \$/W
1	Total	13	37365	70.224 lb	622	47.9 %	52 MWh	78.0 %	45,296 W
2			2905	8,951 lb	461	35.5 %	6,630 kWh	78.0 %	7,800 W
3			20197	6,636 lb	461	35.5 %	4,917 kWh	18.0 %	1,800 W
4			1258	6,383 lb	798	65.7 %	4,728 kWh	42.0 %	4,200 W
5			571	6,380 lb	443	34.1 %	4,726 kWh	85.2 %	8,522 W
6			305	5,570 lb	387	29.8 %	4,126 kWh	18.0 %	1,800 W
7			1633	5,451 lb	379	29.1 %	4,038 kWh	78.0 %	7,800 W
8			365	5,409 lb	735	56.5 %	4,007 kWh	0.0 %	0 W
9			554	5,275 lb	367	28.2 %	3,807 kWh	0.0 %	0 W
10			593	4,864 lb	1,218	93.7 %	3,603 kWh	42.3 %	4,230 W
11			563	4,417 lb	307	23.6 %	3,272 kWh	12.0 %	1,200 W
12			375	3,878 lb	270	20.7 %	2,873 kWh	24.0 %	2,400 W
13			431	3,773 lb	1,200	92.3 %	2,795 kWh	54.0 %	5,400 W
			7615	3,236 lb	925	71.1 %	2,387 kWh	14.4 %	144 W

## Watch the video

SolarVu™ is a cloud computing service using smart grid technology for lifetime monitoring of solar PV systems.

Scan the QRcode image to view a video explaining how SolarVu™ can help you maximize revenue from your solar PV equipment.



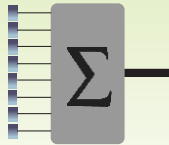
cachelan.com  
905.470.8400  
contactus@cachelan.com

Ask your system provider to install SolarVu™  
Visit live sites at [www.solarvu.com](http://www.solarvu.com)



## SMART COMBINERS

- Alarm notification of low output strings
- Quickly locate and repair bad strings
- Higher revenue from 100% uptime
- Faster commissioning, no routine checks
- Compare different panels



## WeatherTrak™

- Verify actual output to specifications
- Daily insolation, peak irradiance log
- Alarm on low kW at normal irradiance
- Compare panels under same conditions
- Check maximum panel temperature



## SMART Enterprise

- One screen status for multiple sites
- Compare output from similar projects
- Save labour on maintenance contracts
- Remotely diagnose problems quickly
- Performance reports



## Smart Combiners

### Find Bad Panels

A single bad panel reduces the string output leading to lost revenue if not detected. The smart combiner option compares every string and creates an alarm if one string is significantly below the others. Maintenance staff can download a string layout saved from the original design drawings.

Locate the string location from the displayed ID and drawing orientation. Quickly identify and fix the problem cause. Verify the string returns to full normal output before leaving the site. Eliminates guesswork saving troubleshooting time on a roof with hundreds of panels.

### Reduce inspection costs

Use the smart combiner option to verify that every string on a large roof is delivering the expected output current. This speeds up commissioning and customer sign off. By knowing that every string is delivering the expected output at all times, periodic manual current metering checks are not required reducing expensive on-site labour costs.

### Verify output meets specifications

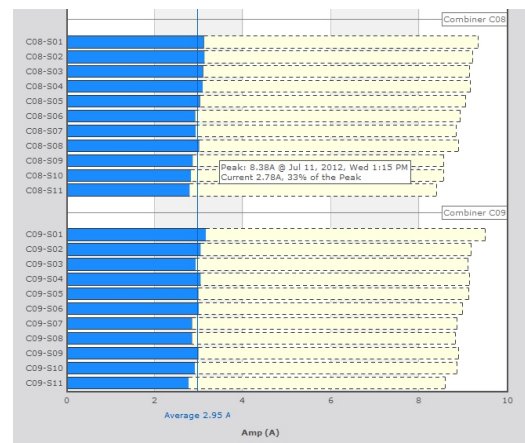
It is hard to tell whether panels are meeting their published specifications under real conditions because the irradiance and temperature constantly change. The smart combiner peak recorder saves the maximum output current with a timestamp showing if panels reach their rated output. Reset the peak recorder any time to start a new measurement interval.

ID	String Name	DC Current	DC Voltage	DC Power	% Rel
C07-S01	String 1	3.33 A	340 V	1,132 W	100 %
C07-S02	String 2	3.19 A	340 V	1,085 W	96 %
C07-S03	String 3	3.29 A	340 V	1,119 W	99 %
C07-S04	String 4	3.20 A	340 V	1,088 W	96 %
C07-S05	String 5	3.21 A	340 V	1,091 W	96 %
C07-S06	String 6	3.15 A	340 V	1,071 W	95 %
C07-S07	String 7	3.15 A	340 V	1,071 W	95 %
C07-S08	String 8	3.09 A	340 V	1,051 W	93 %
C07-S09	String 9	3.13 A	340 V	1,064 W	94 %
C07-S10	String 10	3.03 A	340 V	1,030 W	91 %
C07-S11	String 11	2.80 A	340 V	952 W	84 %
Total		34.57 A		11.8 kW	
Average		3.14 A	340 V	1,069 W	

Alarm	Threshold	> 3.00 A avg	Trigger	< 85 % of Rel	85 %
Sensors	Internal Temp.	41.4°C			
ID	Modbus Address	150	Serial Number	07332	
STATUS	1 low current alarm				

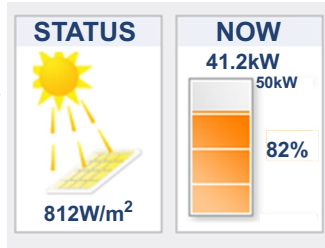
The highlighted red alarm shows string ID C07-S11 is 84% of the maximum string, below the user alarm trigger set at 85%. Download the layout drawing to quickly find and fix the problem.



Compare output now (blue) to the peak output (yellow). Check that the peak output of every string reaches the specified rating to easily identify if any panels are not performing as expected.

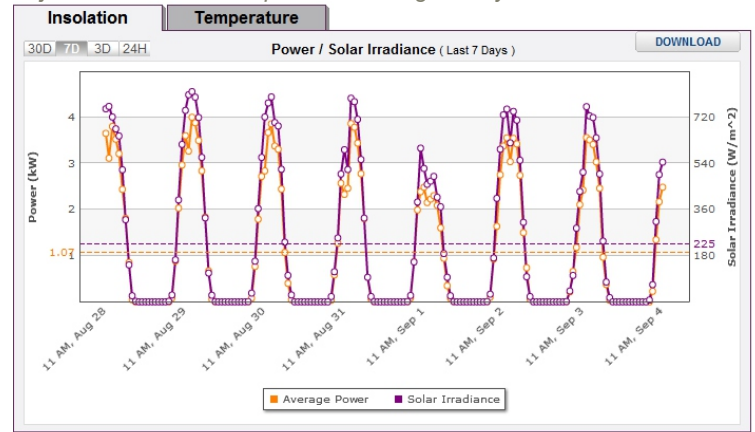
## Compare output to specifications

Check that the system output meets specification under actual conditions of irradiance and temperature. Quickly determine if an inverter is shut down on multi inverter systems. Set an alarm threshold to receive automatic notification for low output.



Daily insolation, energy and peak irradiance are recorded for viewing graphically or downloading for analysis. Use panel temperature measurement under similar irradiance conditions to check actual temperature coefficient which has a significant impact on output. Evaluate panels from different vendors under real conditions.

Compare power generated to rated capacity under different conditions. Adjustable alarm for output below ratings at any irradiance level.



## See all sites on one screen

Efficiently manage multiple site locations from a single log-in with SMART (System Management and Reporting Tool) Enterprise. Quickly identify and fix problems to minimize revenue loss. Unlike proprietary portals from inverter vendors you can add new sites with different equipment using the same interface. Any number of locations can be included and accessed from a PC or mobile device.

IPPs (independent power producers) can generate custom reports for any time period to evaluate performance of their power generation assets. Change settings, compare site performance, troubleshoot problems and share information for managing existing sites and implementing design improvements on new ones.

## Manage maintenance contracts

Installers and project developers that want to offer maintenance contracts as an ongoing service revenue source can remotely diagnose site issues before doing a truck roll. This ensures they have the right equipment to complete a repair in the minimum time. Revenue and performance reports can be delivered to clients with minimal effort providing valuable additional services. Proactive system maintenance increases revenues and increases customer loyalty.

Scan QR code image to see how school boards are using SMART Enterprise to compare schools in their districts.



## SMART Enterprise

**SolarVu™ SMART-ENTERPRISE** | **Cachelan SolarVu**

Performance | Maintenance | PROFILE | Revenue

Sort by any parameter

Create groups of related sites

Go directly to site without login

Quickly identify problem sites

Num	Name	Run Time	Output kWh	Output SolarMap	Sell Size	Sell Energy kWh	Sell Rate	Sell Revenue
Total		19	1,349,473 kWh	2,689 kW	999 MWh			\$ 678,625
1		1.0 Years	98,052 kWh	107.6 %	50,000 W	226 MWh	\$ 0.64	\$ 143,646
2		1.1 Years	85,185 kWh	113.3 %	40,000 W	63 MWh	\$ 0.71	\$ 44,990.52
3		47 Days	53,719 kWh	95.5 %	249 kW	36,792 kWh	\$ 0.64	\$ 25,466.75
4		46 Days	45,034 kWh	81.4 %	250 kW	33,358 kWh	\$ 0.64	\$ 21,349.32
5		46 Days	41,666 kWh	73.7 %	250 kW	30,863 kWh	\$ 0.64	\$ 19,598.32
6		138 Days	25,159 kWh	79.2 %	10,000 W	18,636 kWh	\$ 0.80	\$ 14,946.11
7		1.5 Years	22,546 kWh	86.0 %	10,000 W	16,701 kWh	\$ 0.80	\$ 13,393.86
8		329 Days	20,312 kWh	45.1 %	10,000 W	15,046 kWh	\$ 0.80	\$ 12,066.60
9		321 Days	15,621 kWh	101.2 %	10,000 W	11,571 kWh	\$ 0.80	\$ 9,279.94
10		243 Days	5,310 kWh	62.2 %	10,000 W	3,933 kWh	\$ 0.80	\$ 3,154.27
11					0 kW	0 kWh	\$ 0.64	\$ 0.00
12					0 kW	0 kWh	\$ 0.71	\$ 0.00

Create custom PDF reports for any time period grouped by parameters of interest

