

Definitive Solar Library

Straight Talk Webinars:

Solar Panel Theft Prevention



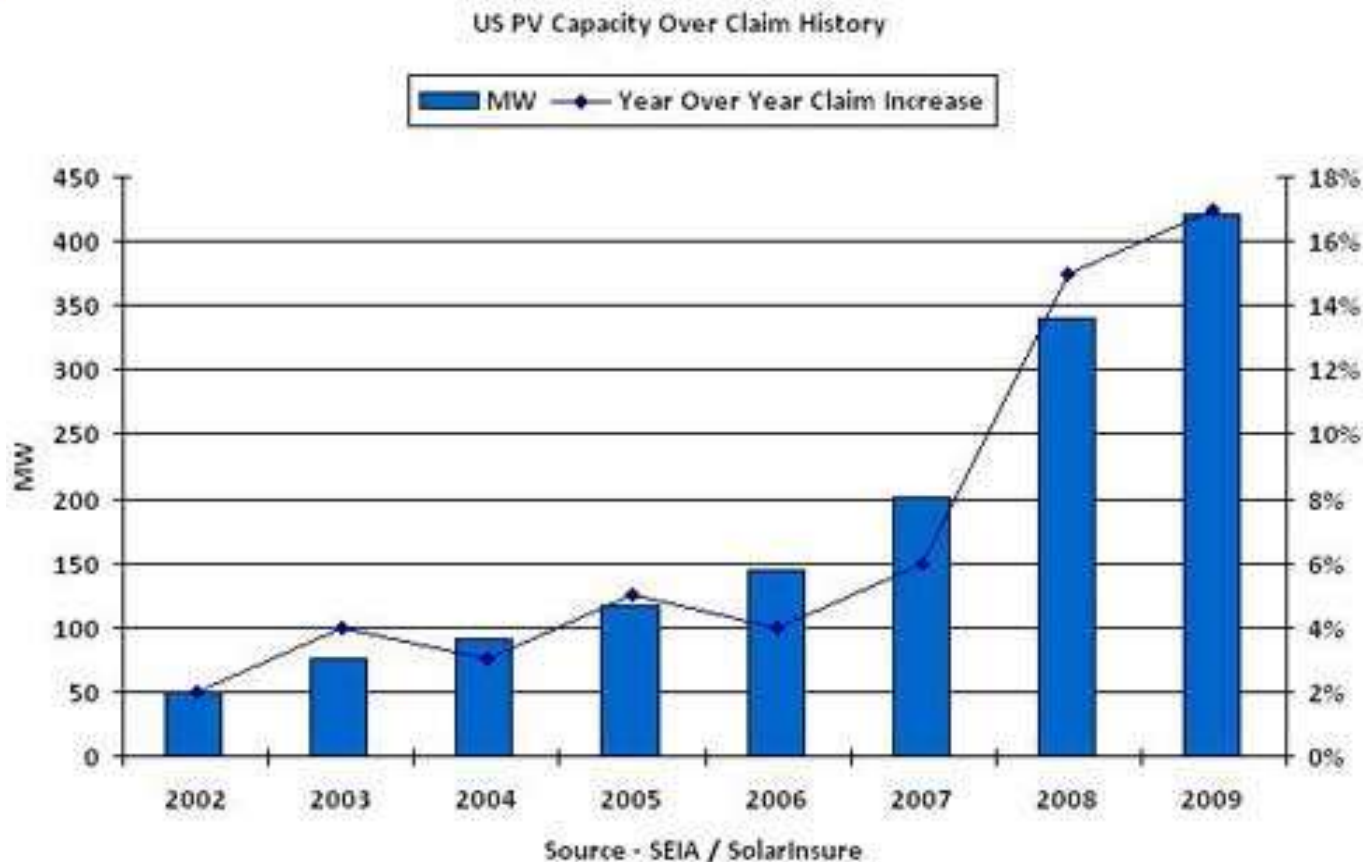
Tim Holmes, Gridlock Solar Security

Mr. Holmes is a Professional Engineer that received his formal education as a Mechanical Engineer with a focus on alternative energy systems and energy management. He has thirty years experience building upon that education through the development and implementation of energy management and renewable energy programs and projects. His expertise is in energy efficiency, distributed generation, greenhouse gas management, and project development and implementation. Mr. Holmes has worked with virtually every energy industry customer segment including utilities, state government, county government, city government, Real Estate Investment Trusts, schools, hospitals, wineries, hotels, industrial complexes, and agricultural facilities. He has hands on experience completing hundreds of energy audits, and developing and implementing dozens of utility programs.

Agenda

- Solar Security Need
- Gridlock System & Features
- System Installation
- Company Contacts
- Questions

Theft is a Growing Industry



<http://www.solarbuzz.com/news/NewsNACO1103.htm>, Solar Buzz, 3/29/2010

Existing Solutions

- “Theft resistant” fasteners
- Security cameras
- Motion Detectors
- Fencing

None of these are tailored to the PV industry

<http://www.solarbuzz.com/news/NewsNACO1103.htm>, Solar Buzz, 3/29/2010

Locking Fasteners



Roof Mounted



Fences, Gates, Barbed Wire



Remote Access



School Roof



What's At Stake

- Expensive insurance deductibles
- Lost power generation revenues
- Unsightly property damage
- Your peace of mind

The Solution

★ Gridlock

- Affordable
- Reliable
- Effective
- Easy to install
- Difficult to defeat



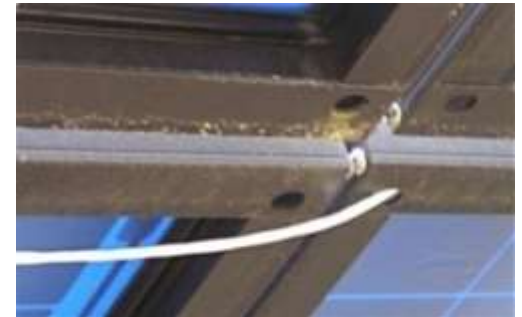
System Installation - Mounting

- Install the Gridlock in a suitable location
- Shade is good ... cooler electronics = longer life
- Avoid flush mounting to metal wall if possible
- Adjust lights prior to silicone sealing
- Some installations have constraints... illumination vs shade



System Installation - Cabling

- Thread cabling through pre-existing holes
- Up to 1000' or 10,000' per loop
- Up to 5 loops per Gridlock (SG50)
- Hint: Use redhead anti-short bushings
- Easier to thread ten 100' lengths vs single 1000' length
- Splice back together using RJ-11's and couplers



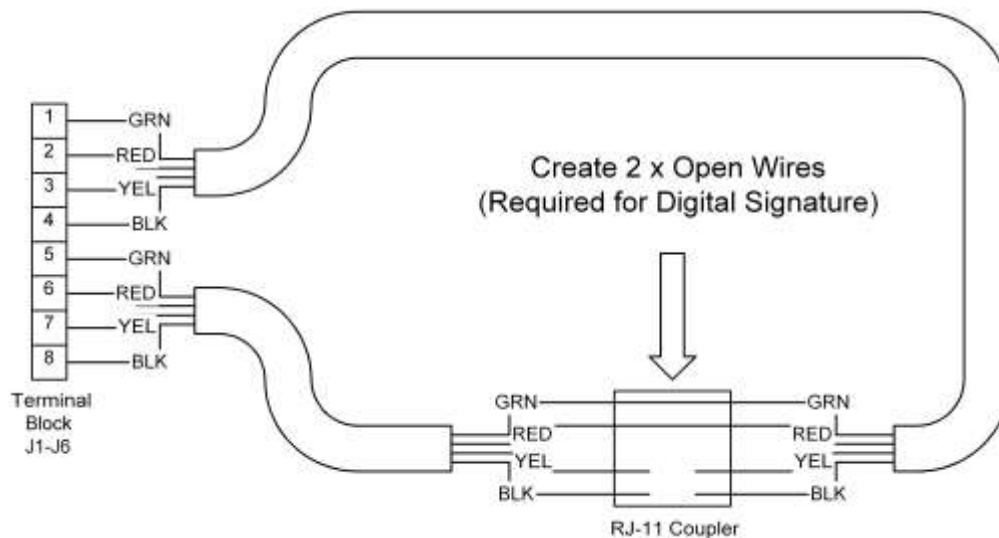
System Installation - Connections

- Connect loops back to Gridlock
- 4 out + 4 in = 8 connections per loop



System Installation – Digital Signature

- Create Digital Signature in each Security Loop
- Choose existing splice point
- Reconnect cable at this splice with:
 - Two closed wires – break wires for no continuity between pins 1,5 and 2,6
 - Two open wires – ensure continuity between pins 3,7 and 4,8

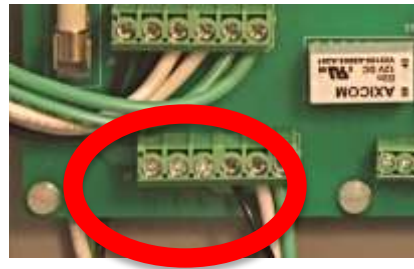


System Installation – Test & Commission

- Test continuity and breaks of all wire loops



- Install AC Power



- Test all alarm modes
 - opens, shorts, tamper switch, AC loss



System Installation – Weatherize

- Gridlock recommends using RJ-11 connectors and couplers in conjunction with high-quality electrical tape and Scotchkote sealant to create a hermetically sealed splice.
- Other splicing methods (solder splices and 3M UR and UY connectors) are acceptable as long as the installer insures that the method provides continuity of cabling and hermetic sealing.



System Installation – Cellular Setup

- Optional
- Configure the cellular service
- Activate SIM card with AT&T
 - Either set up an account, add to existing plan, or purchase prepaid option
 - If using prepaid option, ensure responsible party to re-activate after 1-year



System Installation – Cellular Cont.

- Configure dialer
 1. Enter Contact Information
 - Select SMS (text) or Voice
 - Input phone numbers

	Report Type	Phone
Follow Me 1	SMS	5551234567
Follow Me 2	Voice	5551234567
Follow Me 3	SMS	
Follow Me 4	SMS	
Follow Me 5	SMS	
Follow Me 6	SMS	
Follow Me 7	SMS	
Follow Me 8	SMS	

Voice Message Recurrence: 2

System Installation – Cellular Cont.

- Configure dialer
 2. Edit Text Messages

Text For Input Events		Chars Left
Input 1 Event	SOLAR PANEL THEFT IN PROGRESS	6
Input 1 Restore		35
Input 2 Event	AC POWER FAILURE	19
Input 2 Restore	AC POWER ON	24
Input 3 Event	BATTERY MAINTENANCE REQUIRED	7
Input 3 Restore		35
Input 4 Event		35
Input 4 Restore		35

System Installation – Cellular Cont.

Configure Cellular dialer

3. Associate alarm messages with phone numbers with phone numbers

- Check box to “subscribe” a phone number to an alarm message

Events	VoiceMessages	1	2	3	4	5	6	7	8
Input 1 Event	Message 1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Input 1 Restore		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Input 2 Event	Message 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Input 2 Restore		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Input 3 Event	Message 3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Input 3 Restore		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Input 4 Event	No Message	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Input 4 Restore		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tamper Event	No Message	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tamper Restore		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PSTN Loss Event	No Message	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PSTN Loss Restore		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GSM Trouble Restore		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Main Power Loss Event	No Message	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Main Power Loss Restore		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Low Battery Event	No Message	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Low Battery Restore		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Sleep Peacefully



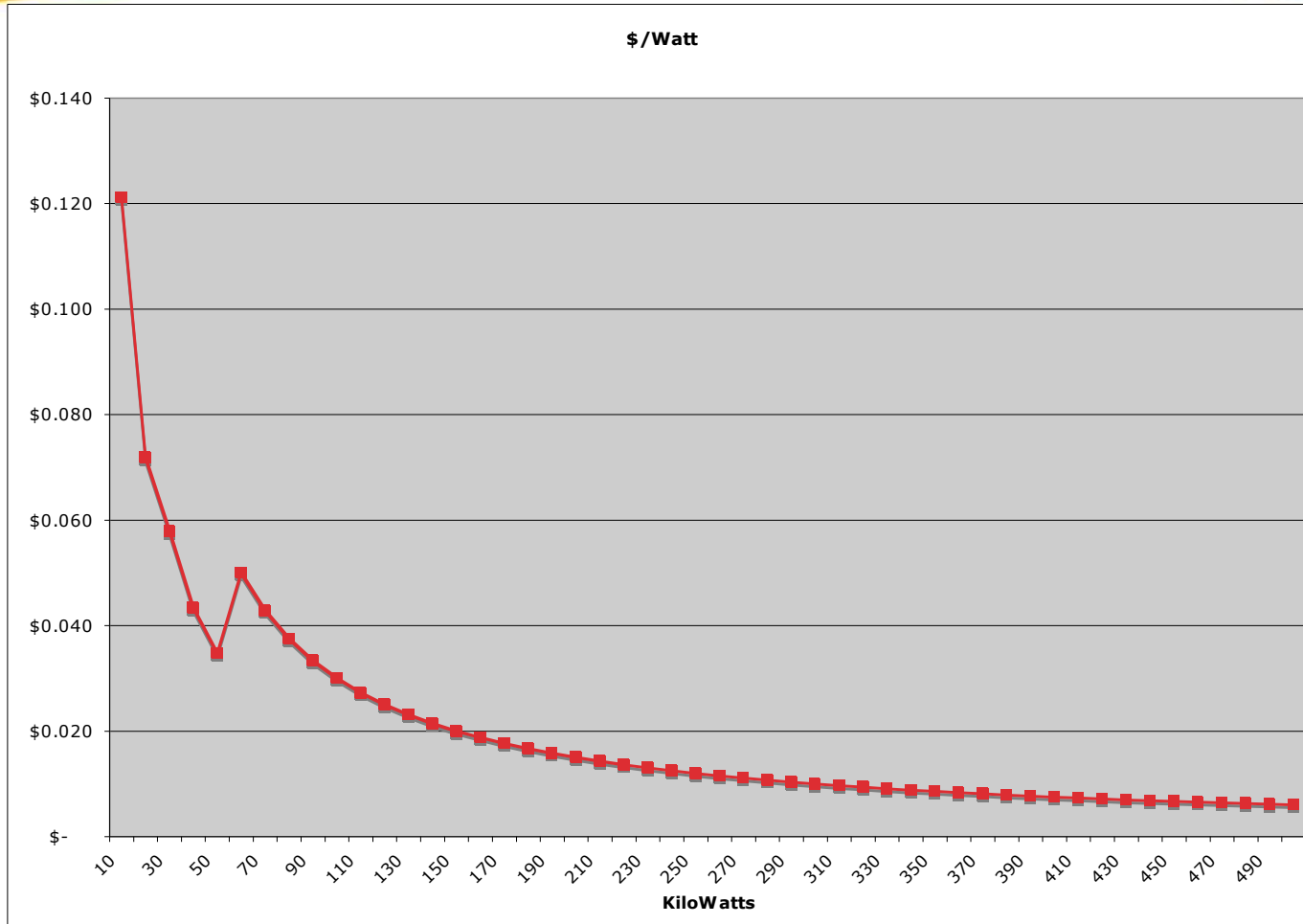
Questions and Discussion

Please enter your questions into the Chat window

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Costing



Discussion Transcript

- ★ Q: What is law enforcement doing about this? Are there any special laws for PV theft or is it just considered a normal property crime?
- ★ A: Most cities won't do anything special - you fill out a form online, and can't even get anyone out there to look at it. Napa County (near Gridlock Solar) has a dedicated process because the crime is so prevalent there among wineries, whose business is crucial to the county.
- ★ Q: Any information on who is stealing these solar systems – an organized crime or petty criminals – how are they fencing the goods?
- ★ A: Most captured thieves are petty criminals, not very bright. Some may be stealing to be off the grid themselves and do something illegal, like grow marijuana, etc. But most tend to re-sell the panels for cash.
- ★ Q: What about the risk of someone getting electrocuted on your property while trying to steal PV panels?
- ★ A: Gridlock system is low-voltage, so no danger of electrocution from it. A PV solar system during bright daytime can have high-voltage DC when PV panels are connected in a string, typically over 400V DC. If you disconnect the quick-connects on the high-voltage size, they will arc until about 6 inches apart. Thieves at least know this much and seem to be staying alive.

Discussion Transcript

- ★ Q: Cost – of Gridlock system and of average panel theft, and insurance premium reduction
- ★ A: SolarInsure – insures solar systems and provides a discount for having the Gridlock system installed. Gridlock design is most cost-effective for medium- to large- systems. It works for small systems but the price per Watt can be prohibitive. Above 500 kW you can protect your system for around 5 cents / W. Most theft is about 20 panels at a time, but a school district might have 3-4 sites hit in one night. Wasterwater treatment plant stole 130 at once – likely on a flat-bed truck. Your loss is about \$400-\$600 per module, plus related damage around the site, and then the replacement labor cost for the new system.
- ★ Q: Is the product designed to be installed by the EPC company, or after the fact by Gridlock?
- ★ A: Designed to be installed during system installation, want to mount cables, or underground in a conduit. Requires 120vAC access. Can be installed after the fact, but this may present more challenges, especially with roof-mounted systems.