

CSMART, Supporting Smart Grid Deployment

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Project Manager

CSMART at The Galvin Center





CSMART – Industry and Academia Collaboration



- Commonwealth Edison (ComEd) – Local Electric Utility and leader in smart grid deployment
- Silver Spring Networks (SSN) – Leading networking platform and solutions provider for smart energy networks
- West Monroe Partners – Business and Technology consulting firm
- Illinois Institute of Technology – Ph. D. granting research institute



ILLINOIS INSTITUTE
OF TECHNOLOGY

SilverSpring
NETWORKS

ComEd
An Exelon Company

westMONROE
PARTNERS

13 S&C Vista Switches

One ZBB battery - 500kW

SCADA – Live Monitoring with the PI System

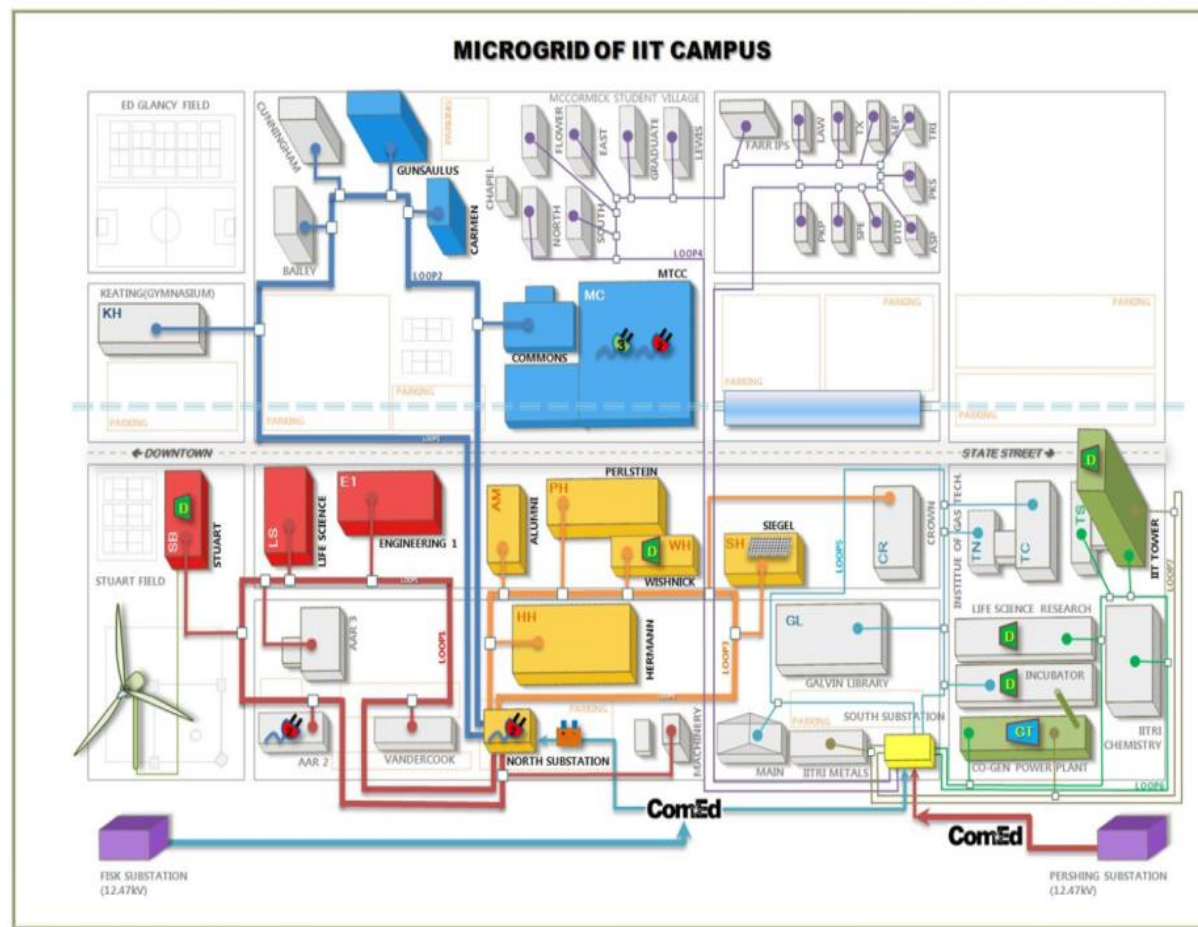
IIT Distributed Generation (DG)

Total - 300kW

Viryd wind turbine - 8kW

Grand Ridge wind turbine - 1.5MW

Total - 8MW capacity



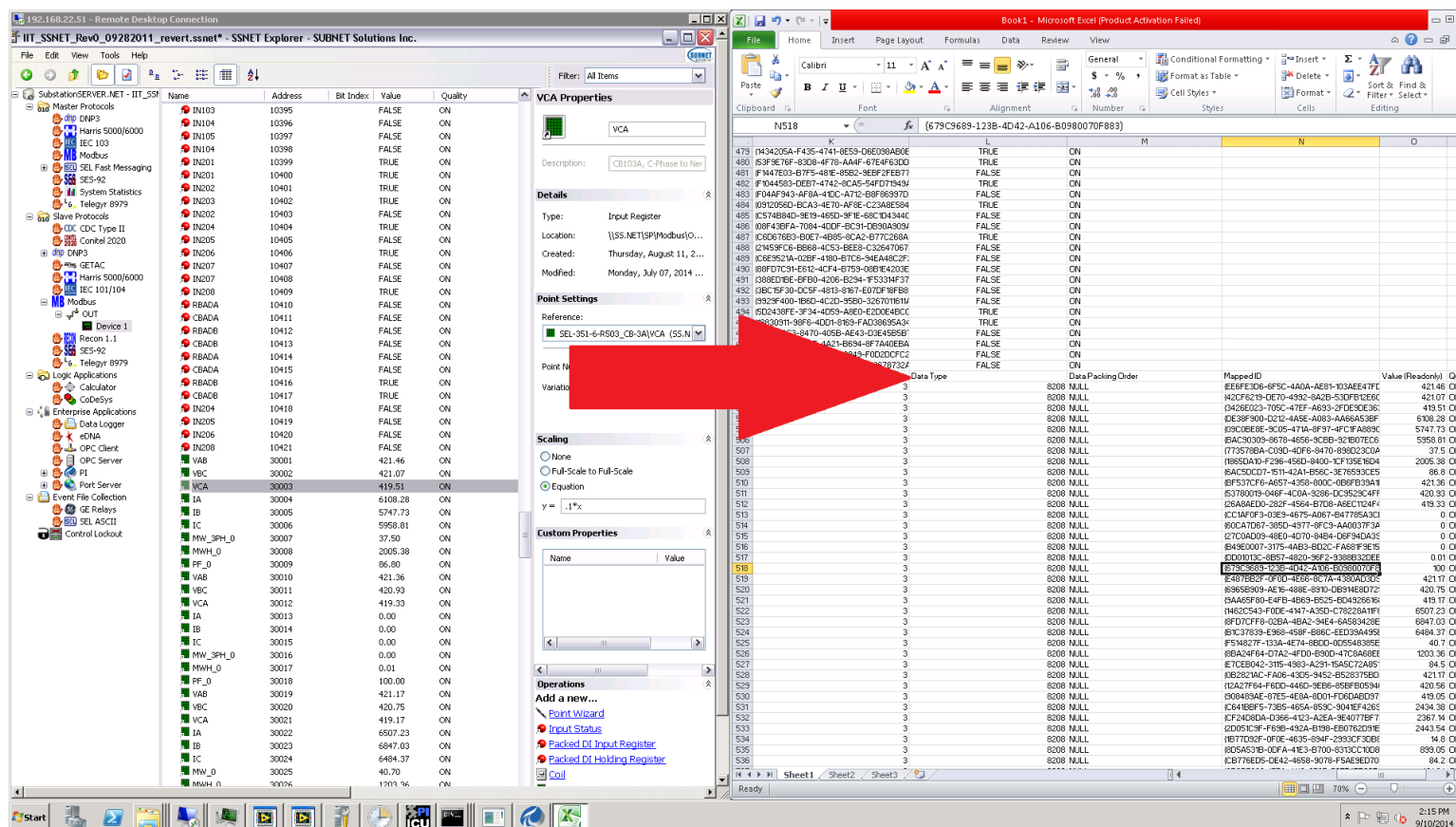
Unfortunate Event

- January 29th, 2014 -
Power outage
 - Data Center
 - Classes in session
- IIT Maintenance search
for problem



Resolution

- Two Simultaneous Events
- Raw Post Outage Data

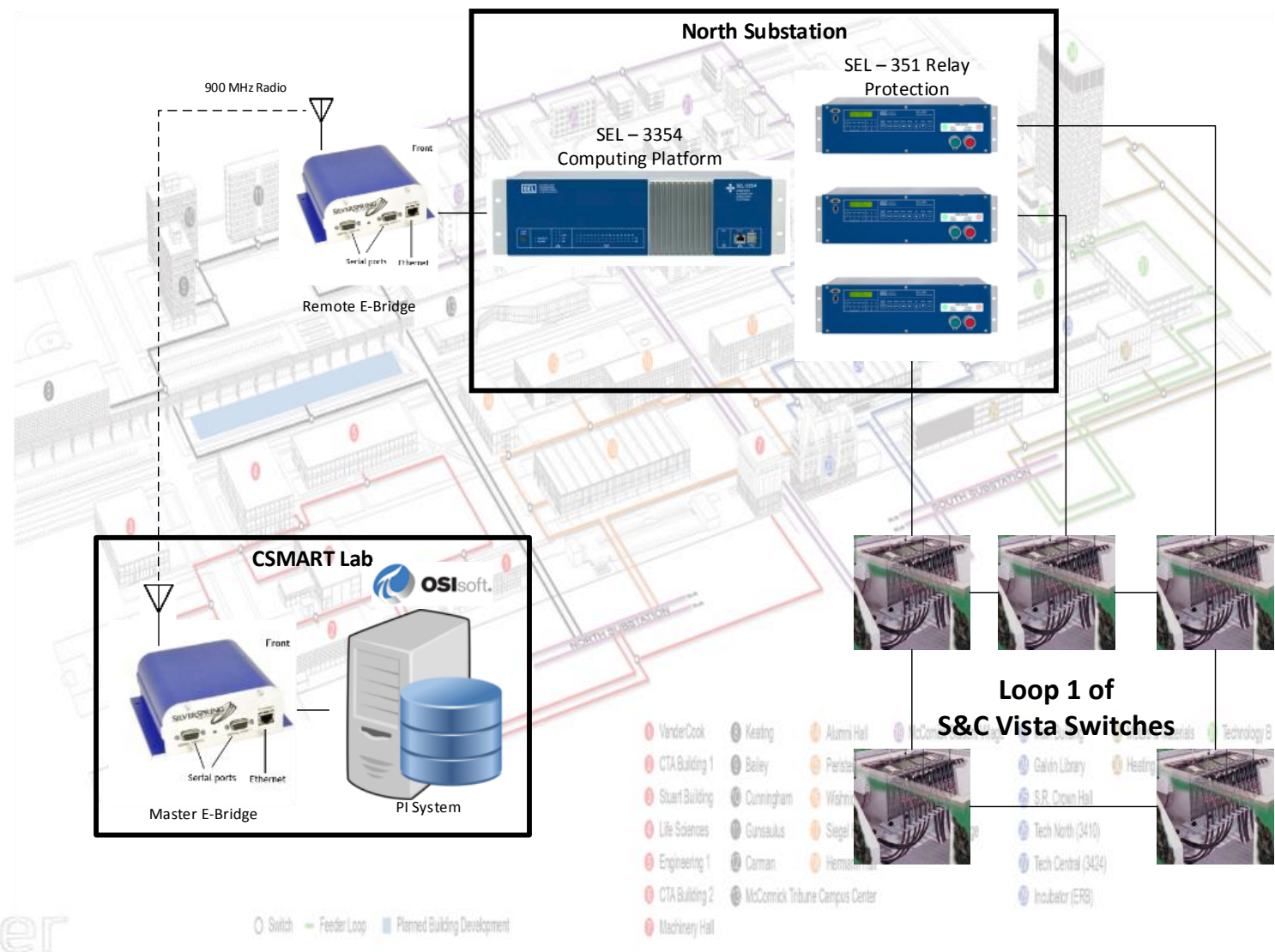


The screenshot displays two windows side-by-side. The left window is 'SSNET Explorer - SUBNET Solutions Inc.' showing a tree view of protocols and a table of data. The right window is 'Book1 - Microsoft Excel (Product Activation Failed)' showing a table of raw post outage data.

SSNET Explorer - SUBNET Solutions Inc.

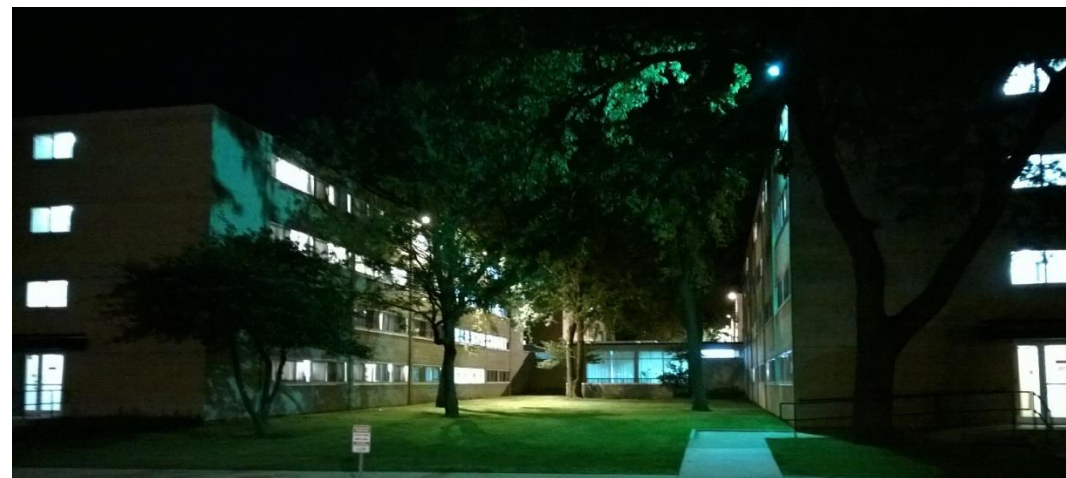
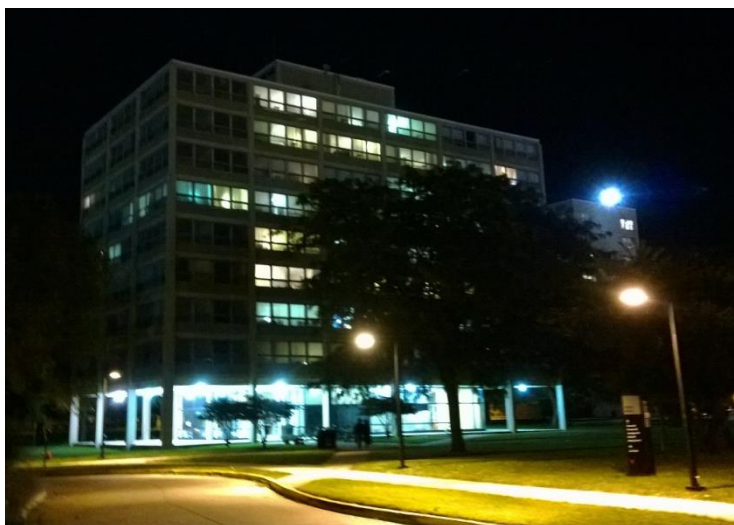
Name	Address	Bit Index	Value	Quality
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IN104	10396	FALSE	ON	
IN105	10397	FALSE	ON	
IN106	10398	FALSE	ON	
IN201	10399	TRUE	ON	
IN202	10400	TRUE	ON	
IN203	10401	TRUE	ON	
IN204	10402	TRUE	ON	
IN205	10403	FALSE	ON	
IN206	10404	TRUE	ON	
IN207	10405	FALSE	ON	
IN208	10406	TRUE	ON	
IN209	10407	FALSE	ON	
IN210	10408	FALSE	ON	
IN211	10409	TRUE	ON	
IN212	10410	FALSE	ON	
IN213	10411	FALSE	ON	
IN214	10412	FALSE	ON	
IN215	10413	FALSE	ON	
IN216	10414	FALSE	ON	
IN217	10415	FALSE	ON	
IN218	10416	TRUE	ON	
IN219	10417	TRUE	ON	
IN220	10418	FALSE	ON	
IN221	10419	FALSE	ON	
IN222	10420	FALSE	ON	
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IN224	10422	FALSE	ON	
IN225	10423	FALSE	ON	
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IN229	10427	FALSE	ON	
IN230	10428	FALSE	ON	
IN231	10429	FALSE	ON	
IN232	10430	FALSE	ON	
IN233	10431	FALSE	ON	
IN234	10432	FALSE	ON	
IN235	10433	FALSE	ON	
IN236	10434	FALSE	ON	
IN237	10435	FALSE	ON	
IN238	10436	FALSE	ON	
IN239	10437	FALSE	ON	
IN240	10438	FALSE	ON	
IN241	10439	FALSE	ON	
IN242	10440	FALSE	ON	
IN243	10441	FALSE	ON	
IN244	10442	FALSE	ON	
IN245	10443	FALSE	ON	
IN246	10444	FALSE	ON	
IN247	10445	FALSE	ON	
IN248	10446	FALSE	ON	
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IN254	10452	FALSE	ON	
IN255	10453	FALSE	ON	
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IN257	10455	FALSE	ON	
IN258	10456	FALSE	ON	
IN259	10457	FALSE	ON	
IN260	10458	FALSE	ON	
IN261	10459	FALSE	ON	
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IN263	10461	FALSE	ON	
IN264	10462	FALSE	ON	
IN265	10463	FALSE	ON	
IN266	10464	FALSE	ON	
IN267	10465	FALSE	ON	
IN268	10466	FALSE	ON	
IN269	10467	FALSE	ON	
IN270	10468	FALSE	ON	
IN271	10469	FALSE	ON	
IN272	10470	FALSE	ON	
IN273	10471	FALSE	ON	
IN274	10472	FALSE	ON	
IN275	10473	FALSE	ON	
IN276	10474	FALSE	ON	
IN277	10475	FALSE	ON	
IN278	10476	FALSE	ON	
IN279	10477	FALSE	ON	
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IN281	10479	FALSE	ON	
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IN302	10500	FALSE	ON	
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IN382	10580	FALSE	ON	
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IN413	10611	FALSE	ON	
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IN425	10623	FALSE	ON	
IN426	10624	FALSE	ON	
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IN488	10686	FALSE	ON	
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IN490	10688	FALSE	ON	
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IN492	10690	FALSE	ON	
IN493	10691	FALSE		

CSMART PI System Overview



Second event

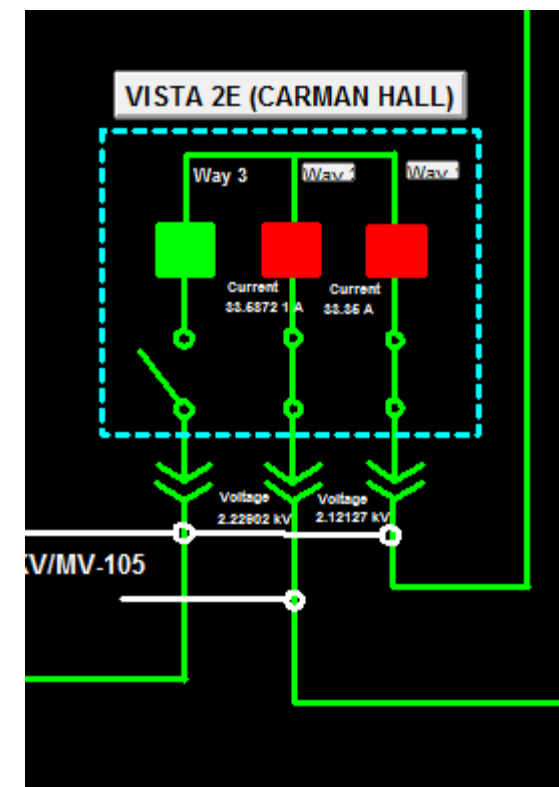
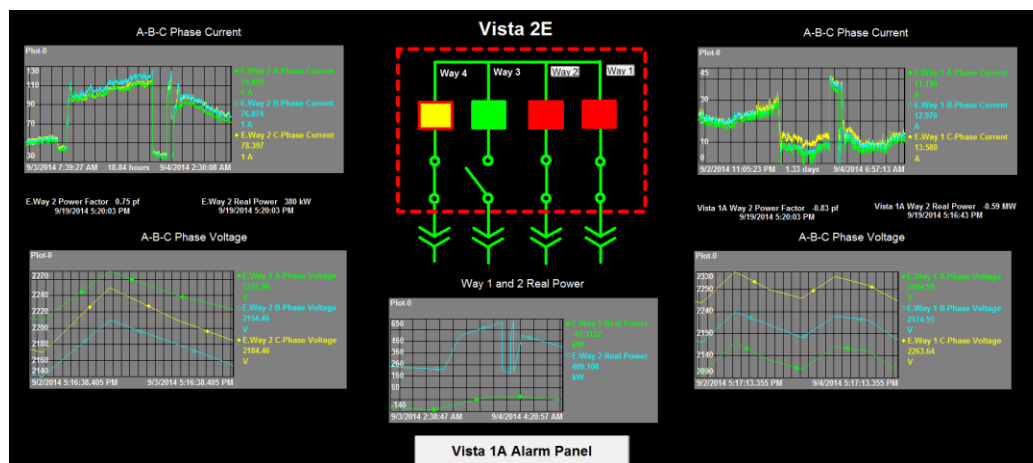
- September 3rd, 2014 - Outage in residence halls and fraternity houses



- IIT Maintenance search for problem, again

Resolution

- Accessed real time data
- Distributed to key people
- Outage over in under 20 minutes
 - Saved time
 - Protected resources on UPS

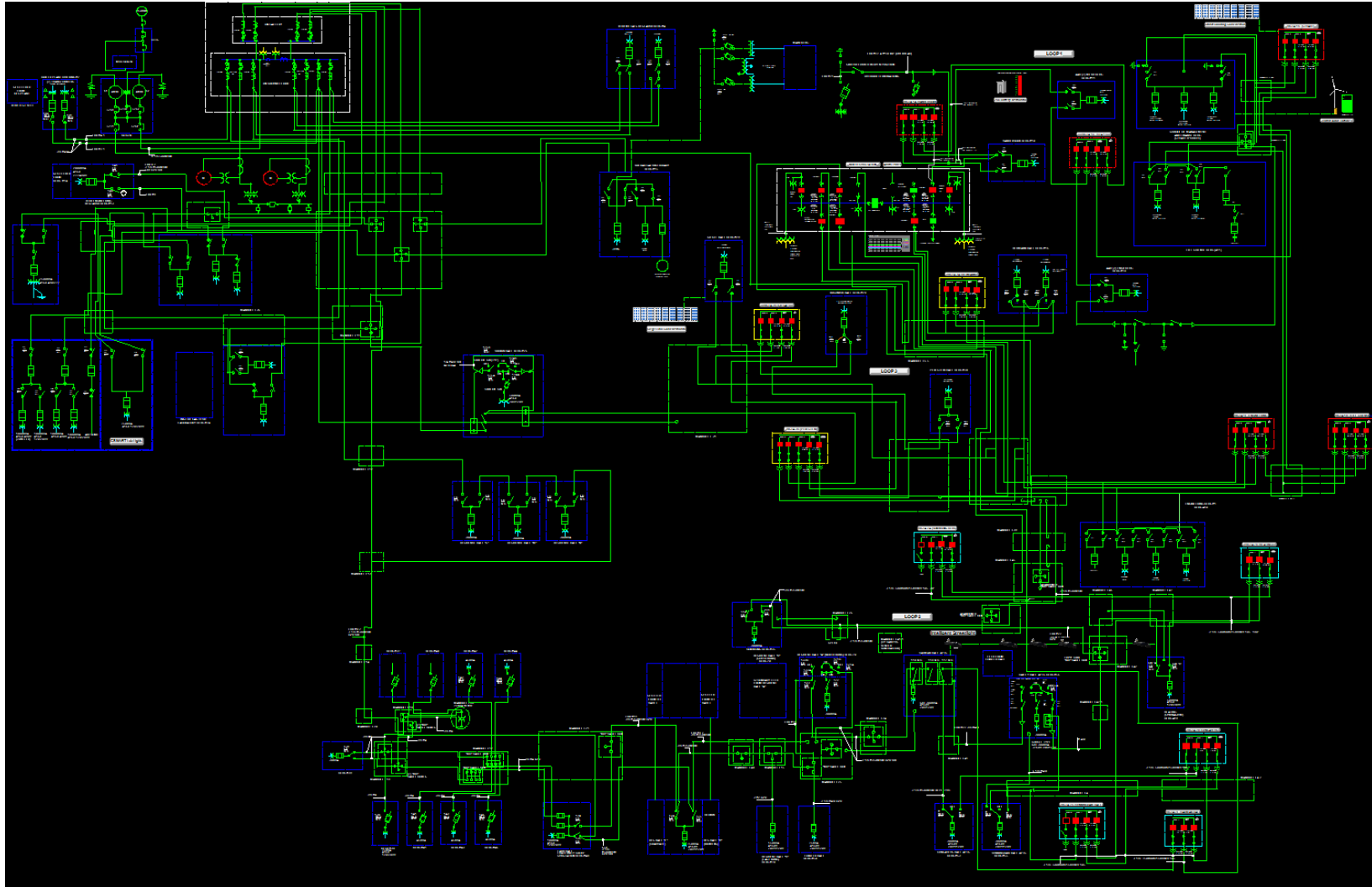


PI ProcessBook (IIT SCADA)

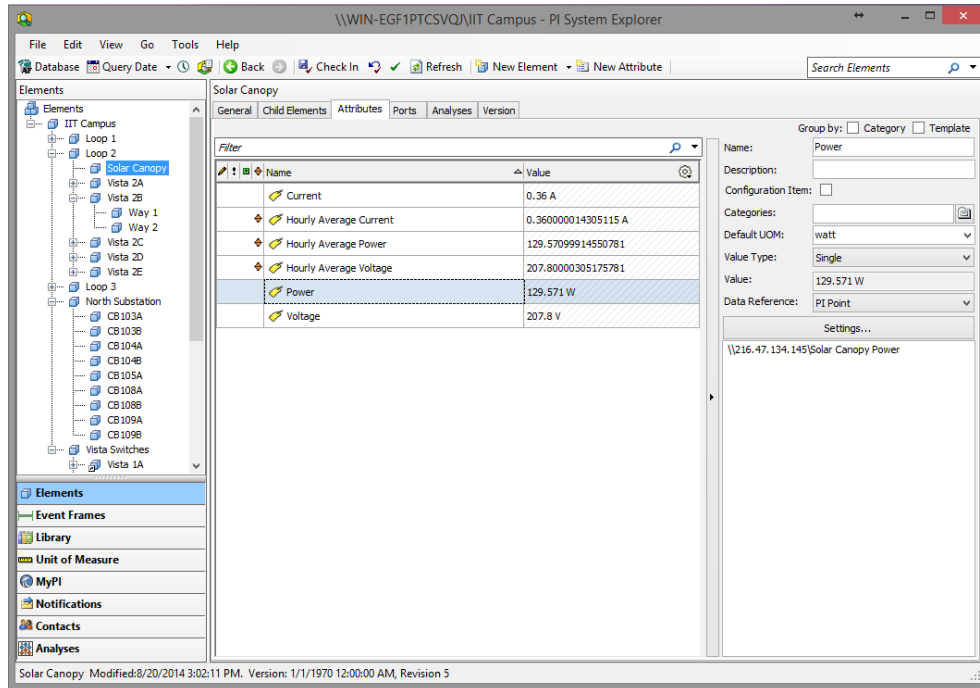
Coresight Web Page



IIT Single Line diagram



Asset Framework & Live Notifications



The screenshot shows the PI System Explorer interface. On the left, a tree view displays the asset hierarchy: IIT Campus > Loop 1 > Solar Canopy. The main pane shows the 'Solar Canopy' asset with a table of live data:

Name	Value
Current	0.36 A
Hourly Average Current	0.360000014305115 A
Hourly Average Power	129.57099914550781
Hourly Average Voltage	207.80000305175781
Power	129.571 W
Voltage	207.8 V

Below the table, the 'Settings...' section shows the path: \\216.47.134.145\Solar Canopy Power.

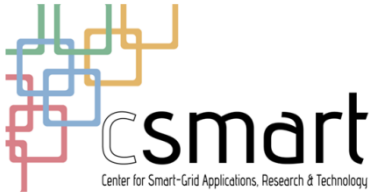
- Status updates
- Analytics help 'digest' data
- Equipment Information

IIT Campus\North Substation\CB104A\Notifications[North Substation Status CB104A] is OPEN.

iiismartgridnotifications@gmail.com
Sent: Tue 10/14/2014 4:45 PM
To: pburgess@hawk.iit.edu

Name: North Substation Status CB104A
Database: IIT Campus
Start Time: 10/14/2014 4:43:08 PM Central Daylight Time (GMT-05:00:00)
Trigger Time: 10/14/2014 4:43:08 PM Central Daylight Time (GMT-05:00:00)
Target: IIT Campus\North Substation\CB104A
State: North Substation Alerts
Priority: Normal

Attribute	Value	Timestamp
Status	OPEN	10/14/2014 4:43:03 PM Central Daylight Time (GMT-05:00:00)
A-Phase Current	92.16A	10/14/2014 4:43:03 PM Central Daylight Time (GMT-05:00:00)
B-Phase Current	327.67A	10/14/2014 4:43:03 PM Central Daylight Time (GMT-05:00:00)
C-Phase Current	327.67A	10/14/2014 4:43:03 PM Central Daylight Time (GMT-05:00:00)
A-Phase Voltage	3700V	10/14/2014 4:43:03 PM Central Daylight Time (GMT-05:00:00)
B-Phase Voltage	250V	10/14/2014 4:43:03 PM Central Daylight Time (GMT-05:00:00)
C-Phase Voltage	3450V	10/14/2014 4:43:03 PM Central Daylight Time (GMT-05:00:00)



OSIsoft's Benefits

- Greater Visibility
- Faster Response Time
- Reduced Costs
- Baseline for future developments
- Data Analytics



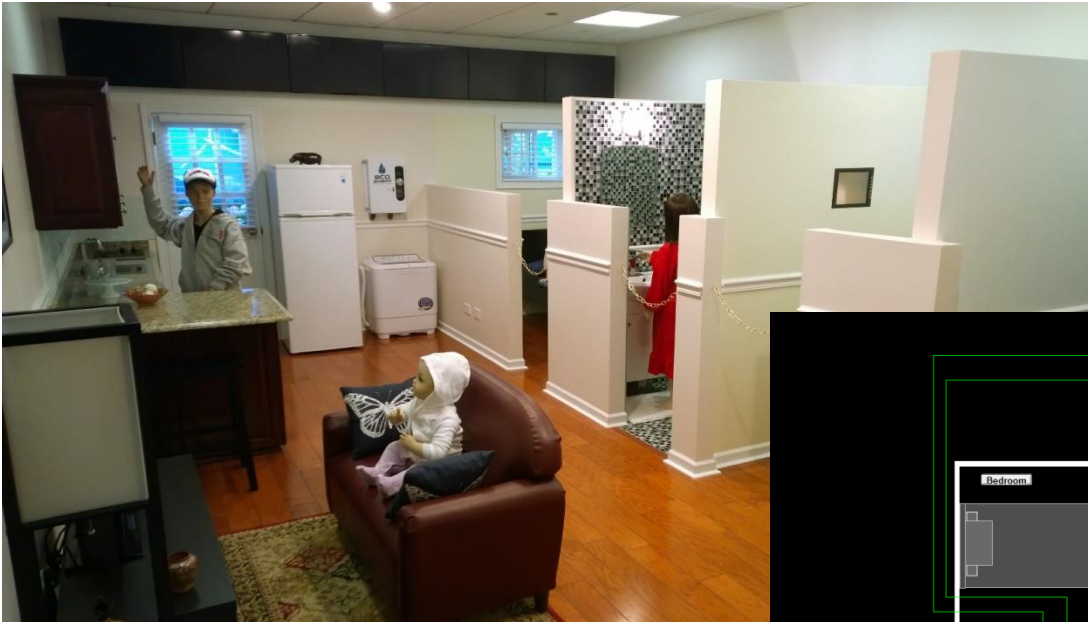
Student Benefits

- Exposure and Opportunities
- Work Force Training

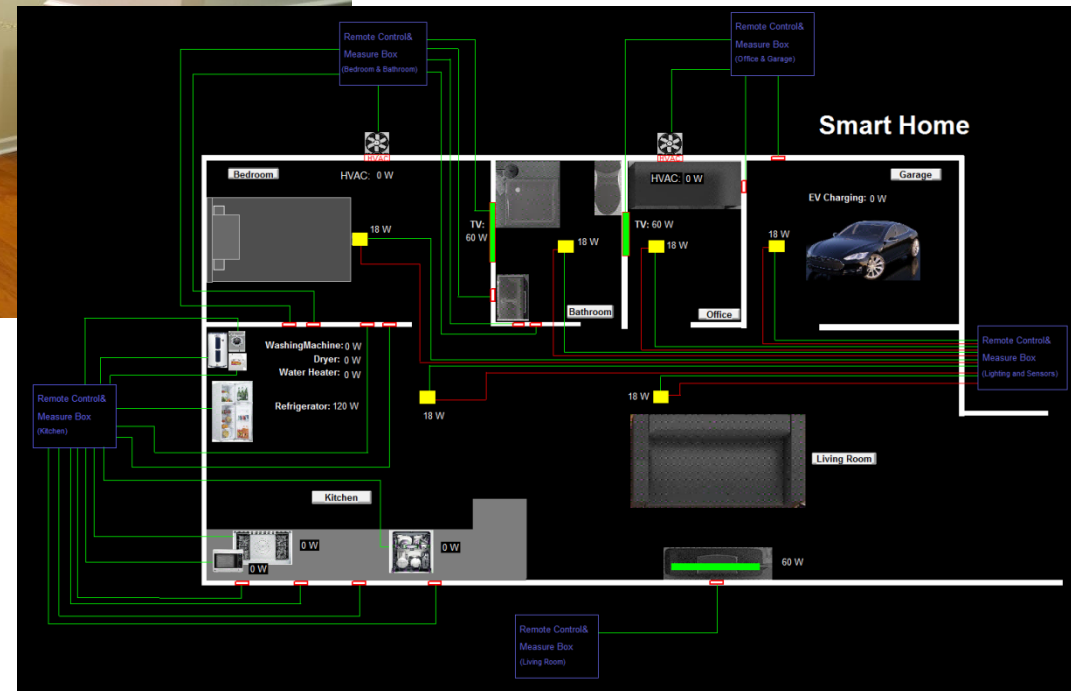


- Tours and Education Sessions
- Course Curriculums

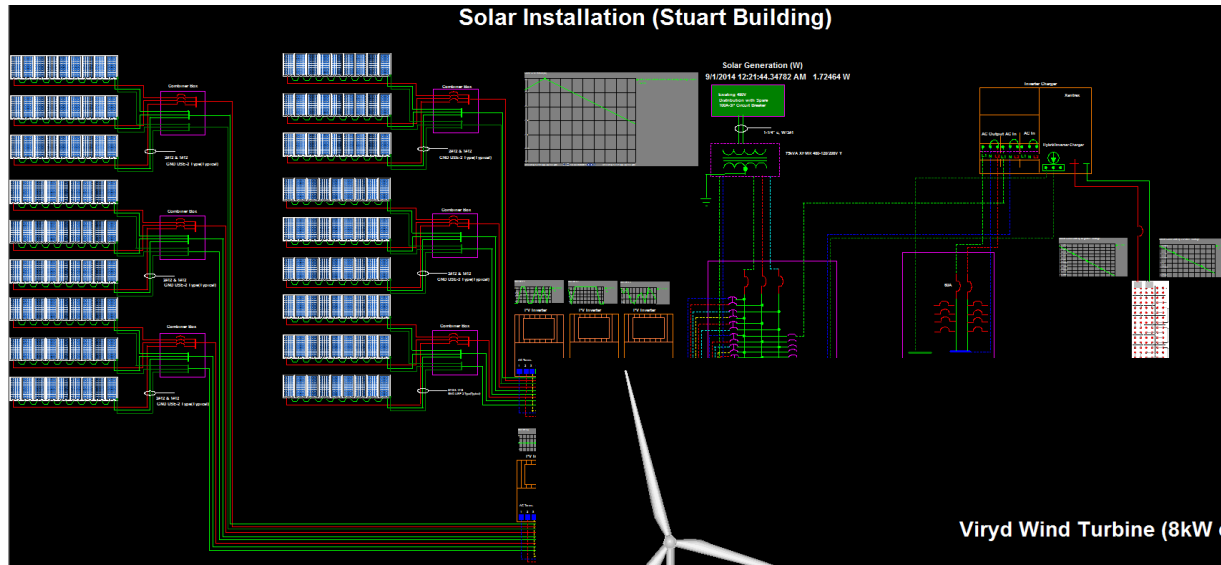
Smart Home – Energy Monitoring



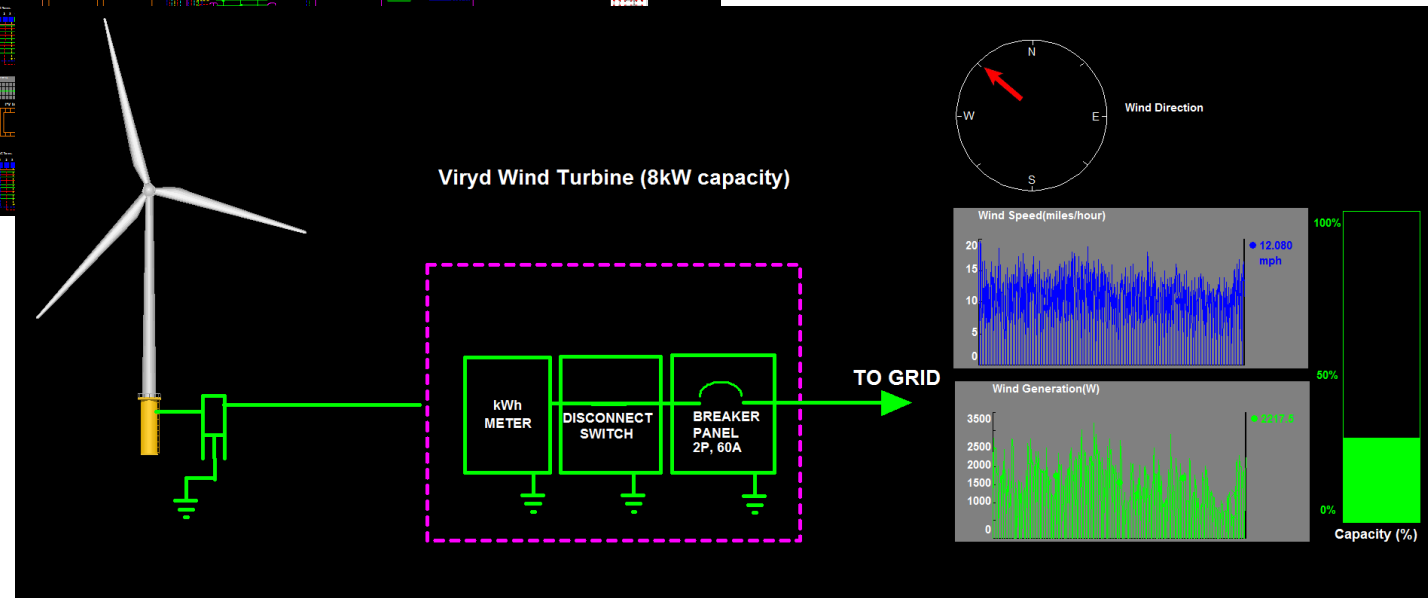
- Live Monitoring
- Simulation with real time pricing



Renewable Generation



- Historical Data – will be used for predictions
- Email Status Updates



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