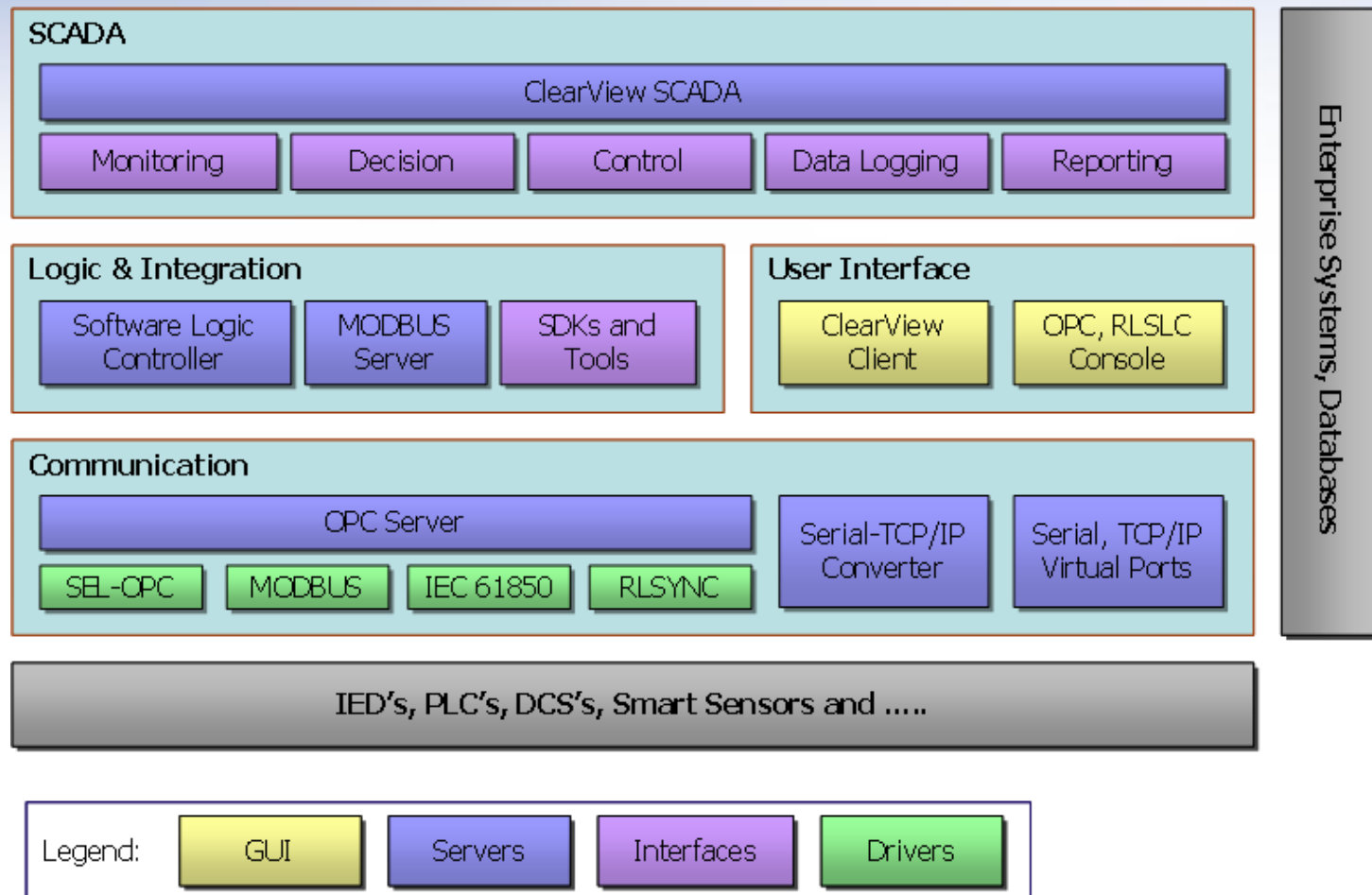


Contents



- SCADA Overview
- Platform
- ClearView
- OPC Server & Drivers

ReLab Software Platform



- Foundation for all ReLab Solutions
- Flexible and customizable
- Areas
 - Communication
 - Integration
 - Supervisory Control & Data Acquisition
 - Data Collection and Analysis
 - Visualization

- Distribution Substations
- Transmission Substations
- Generation Plants
 - Wind Farms
 - Solar Farms
- Refineries
- Chemical Plants
- Manufacturing Plants
- Mining Operations

Sample Global Applications 1/2



Country	Application	Description
Australia	Industrial	Aluminum Mine (ClearView Enterprise) Desalination Plant
Indonesia	Utility	All new and upgraded distribution substations
Brazil	Industrial and Utility	Refineries Transmission Substations Distribution Substations Manufacturing Plant Substations Cogeneration Plants Small Hydro
South Korea	Industrial	Electronics MFG Plants Refineries
Serbia	Utility	Transmission Substations Distribution Substations
Czech Republic	Industrial	Power Data to DCS, Power Plant

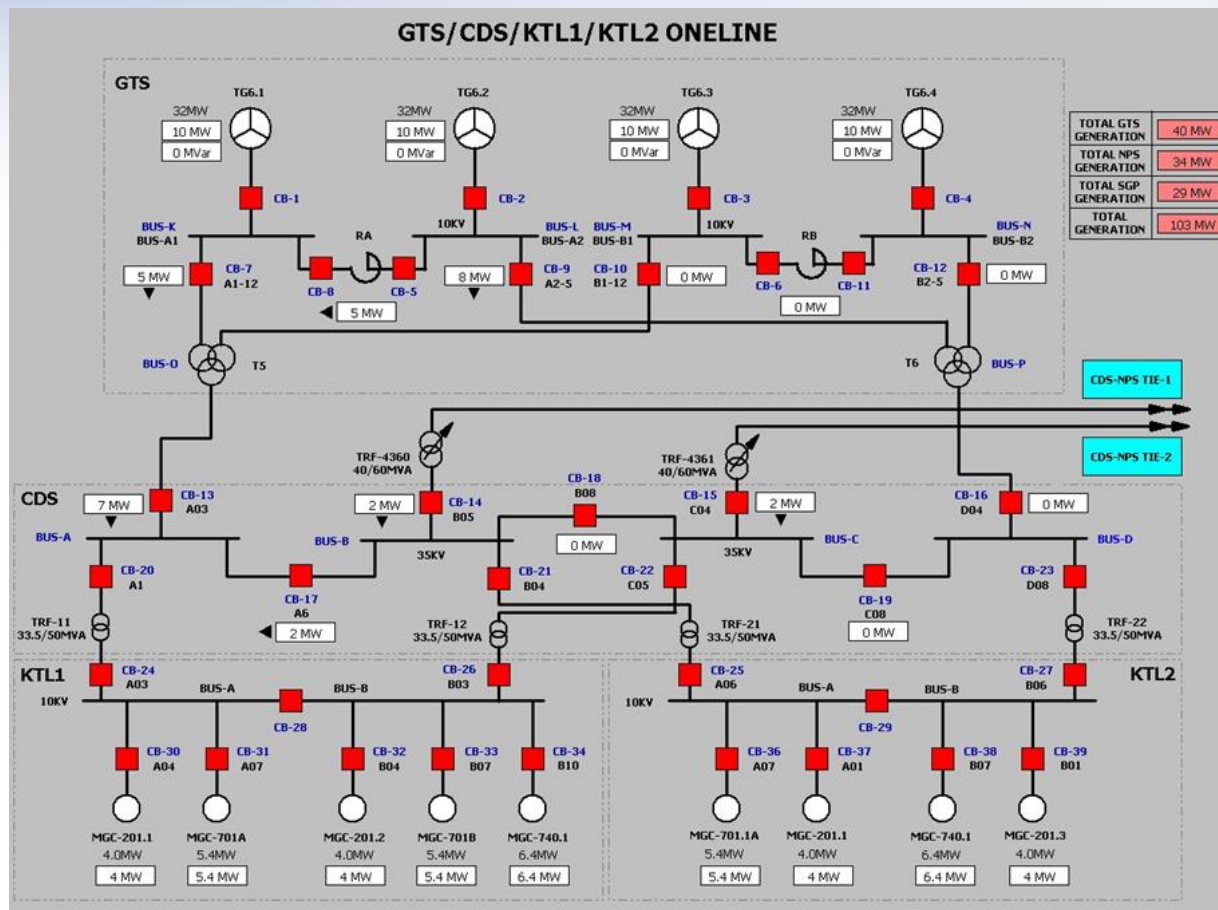
Sample Global Applications 2/2



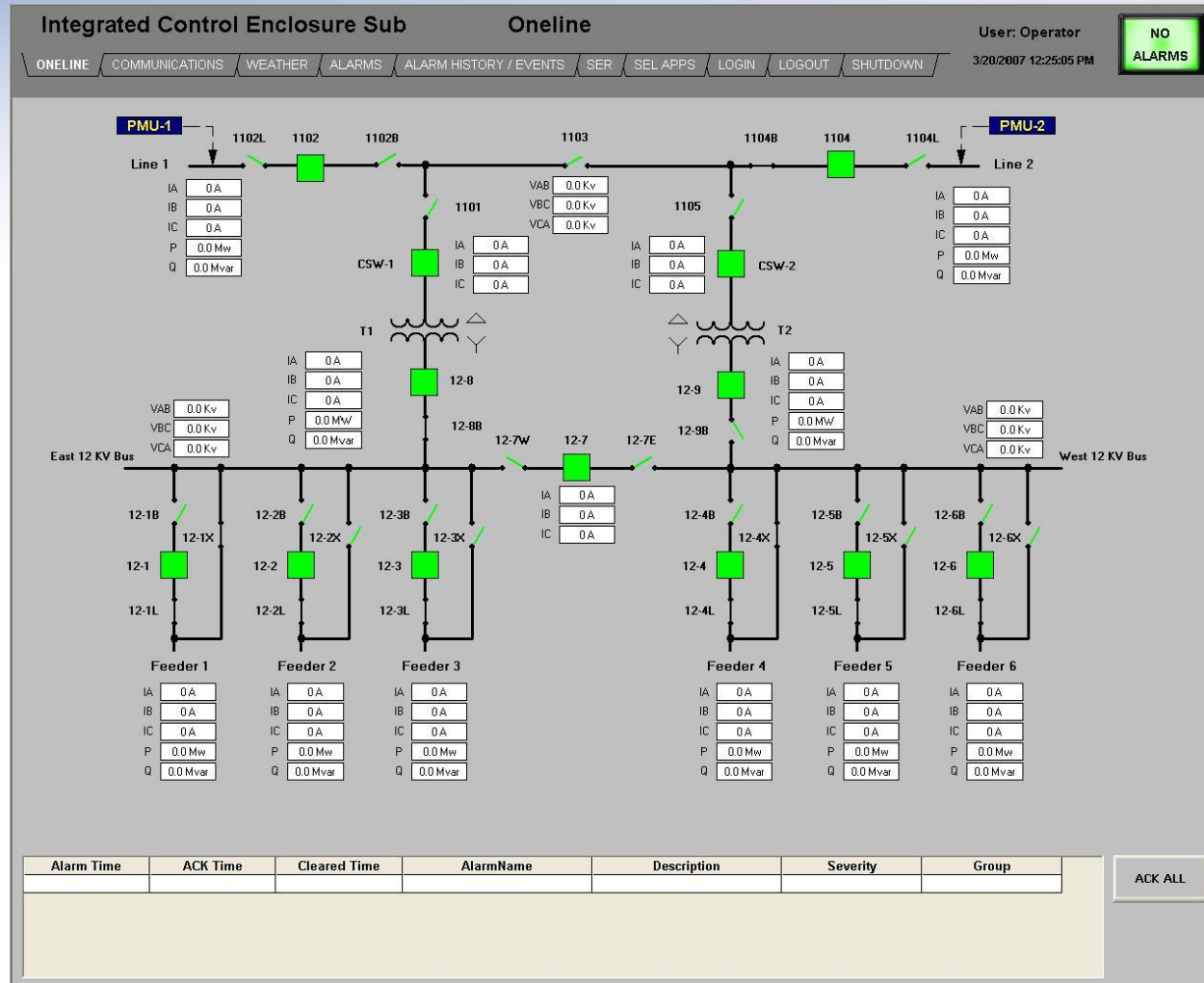
Country	Application	Description
Vietnam	Utility	New Distribution Substations
Peru	Industrial	Mining Operations
Italy	Industrial	Chemical Plant
USA	Utility Industrial	Distribution Substations Transmission Substations Wind Farms Solar Plants Refineries Chemical Plants Mining Operations Power Plants
Colombia	Utility	Distribution Substations
Canada	Utility Industrial	Distribution Substations Wind Farms Mining Operations
Mongolia	Utility	Distribution Substations Generation Substations - Mining

- Leading SCADA solution
- Open access to industrial data
- Advanced visualization tools
- Data logging
- Historical data analysis, trending, reporting
- Comprehensive alarm processing
- Powerful tool for rapid project development
- Simple wizards
- Advanced scripting
- Advanced security
- Redundancy
- Localization support

One Line Example



One Line Example



SCADA Fundamentals Description



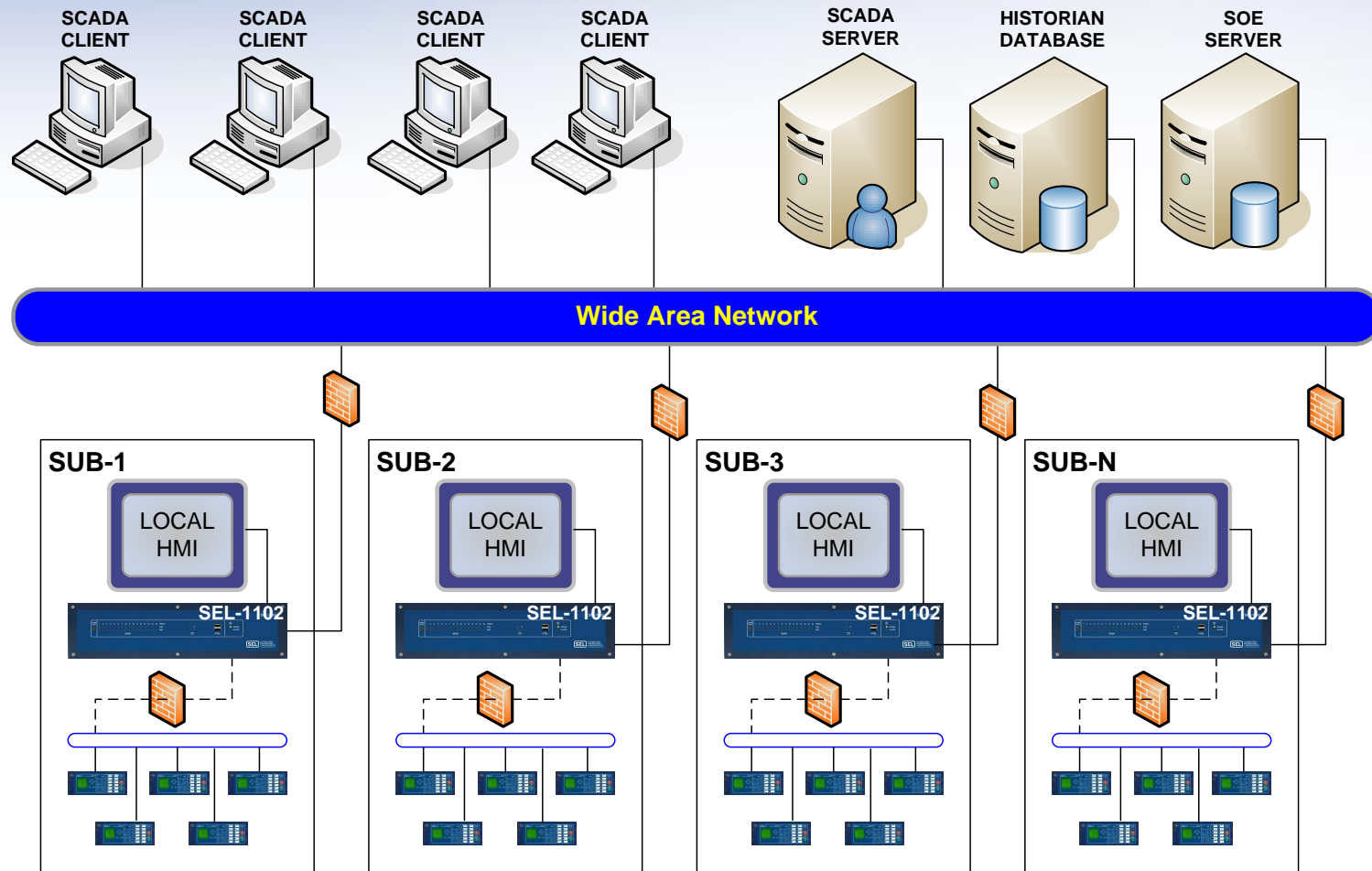
- **Open system topology**
 - Script based customization
 - Provides Automation Interfaces and tools
 - Custom application development
- **Client–Server architecture**
 - Multiple OPC and SCADA Servers
 - Multiple SCADA and OPC Clients
 - Redundant solutions
- **Compliance with industry standards**
 - OLE/DB and ODBC
 - COM, OPC and ActiveX technologies
- **Superior graphical interface**
 - Built-in objects
 - Extended object libraries
 - Ability to use 3rd party ActiveX objects
 - Access to any object's public property
 - Ability to create & share new objects
- **Enhanced system security and audit trailing**
 - Network-wide individualized access
 - Object level access rights
 - Compliance with 21 CFR part 11 regulations
- **Alarm, events and data logging**
 - All alarm and events are logged automatically
 - User selectable data logging
- **Analytical tools**
 - Built-in trend-viewer
 - Built-in reports
 - User configurable trending
 - User configurable reports
 - Alarm/Event viewer and query tool
 - Chart ActiveX controls
 - Maintenance logbook
- **Multi-Language Support (Globalization)**

ReLab Enterprise SCADA Solution

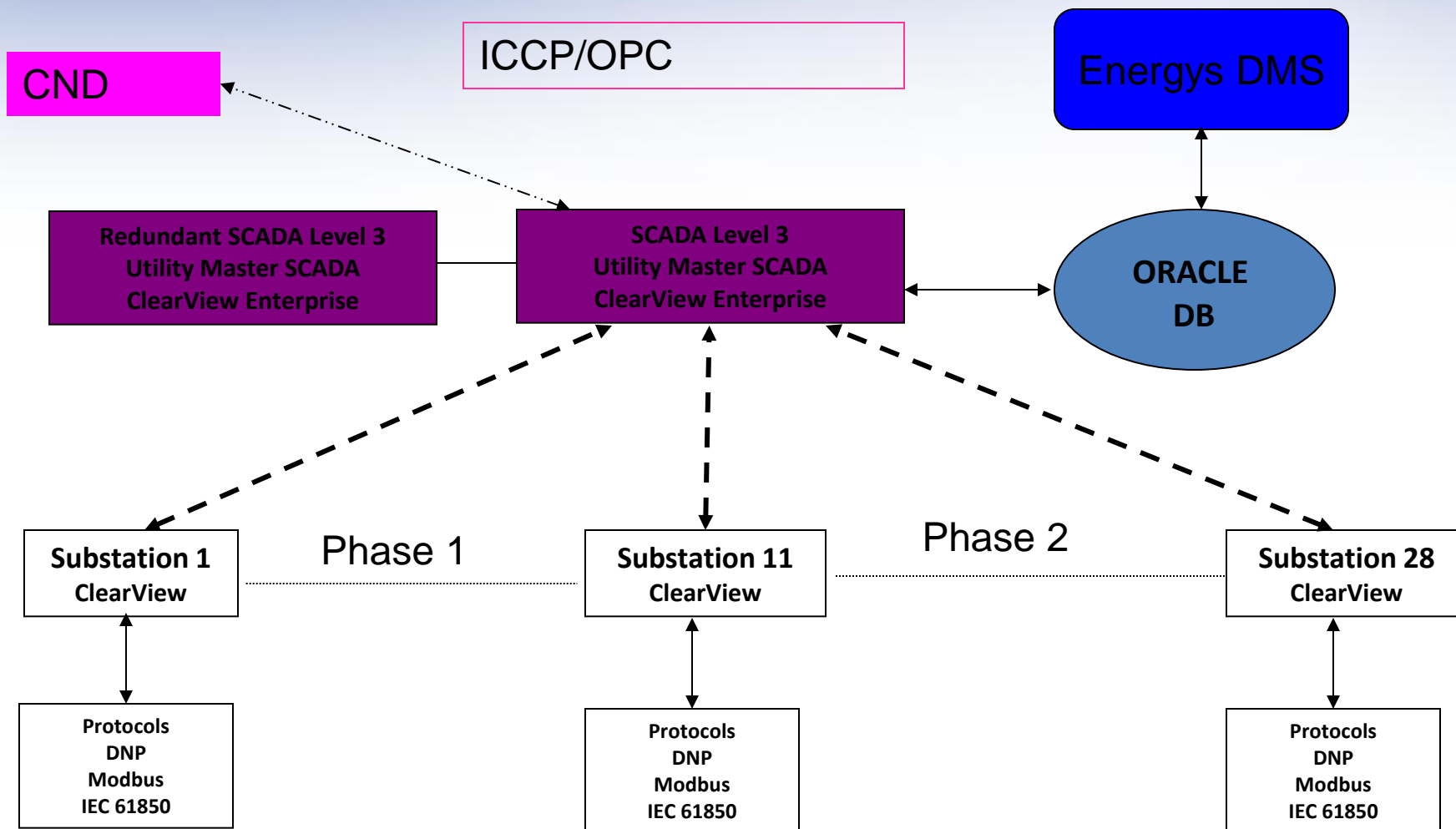


- Based on ReLab Software Platform
- Inherits all qualities of the Platform
 - Performance (50K updates per second)
 - Robustness (built on proven technologies)
 - Scalability (from single substation SCADA to Enterprise solution)
 - Integration capabilities
- Flexibility, customization
- Rapid project development (online modifications and more)

ReLab Enterprise SCADA Solution

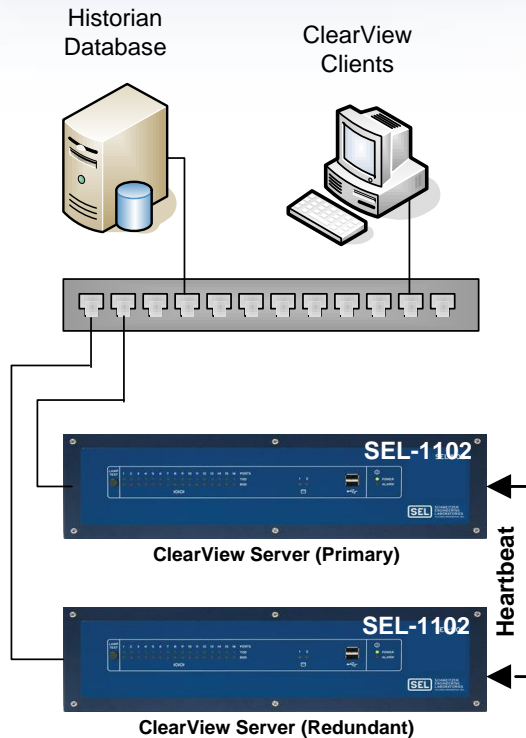


Utility Level 3 Application Using OPC Communication

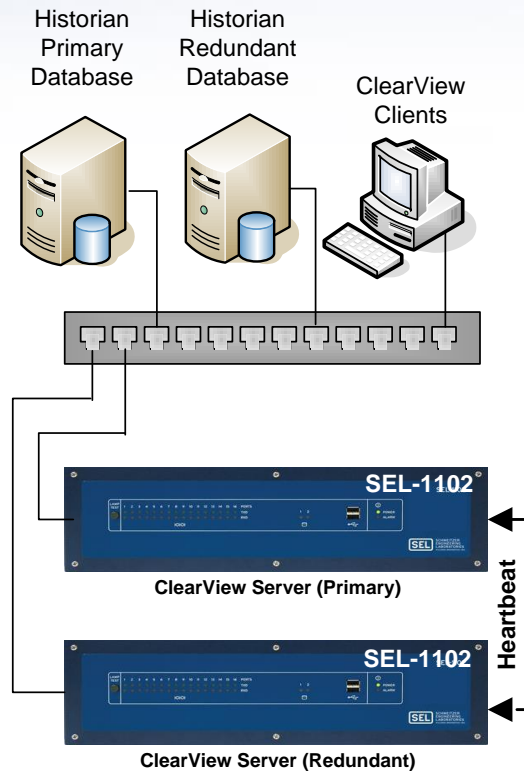


ReLab SCADA Redundancy Topology

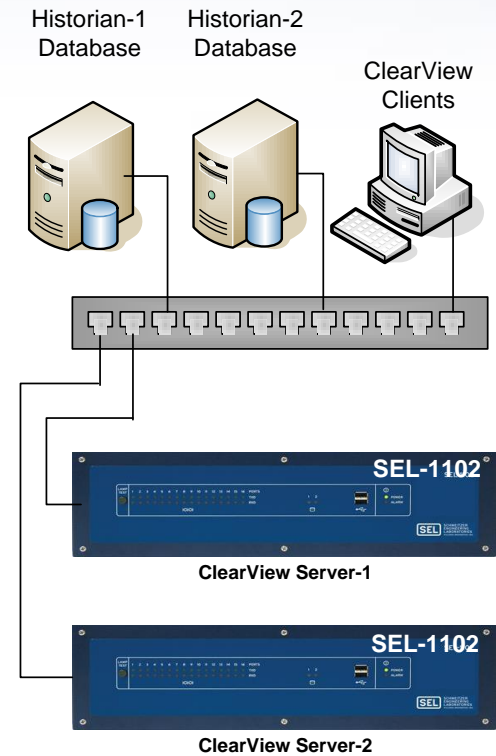
Basic Redundancy



Redundant Historians



Parallel Systems



ClearView Geographical Information System (CVGIS)

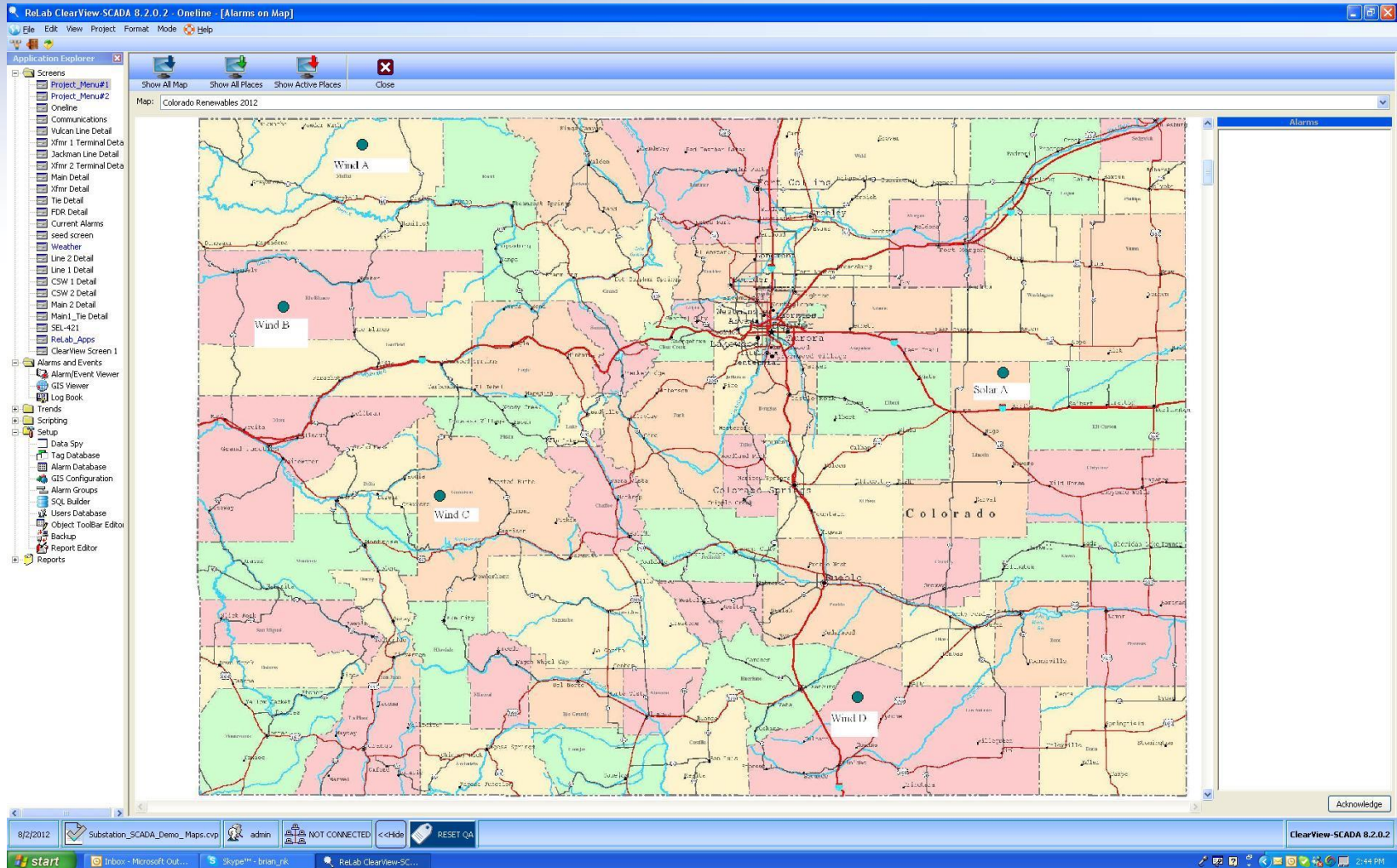


- Geographical Information System (GIS) option now available with ClearView
 - Provides geographical view of assets
 - Can be used to monitor independent and interdependent assets
- Based on Alarms and Tag from ClearView project database
- Easy to use, operates within the ClearView Client
 - Separate Configuration and View screens
- Can be use in standard ClearView and ClearView Enterprise applications.

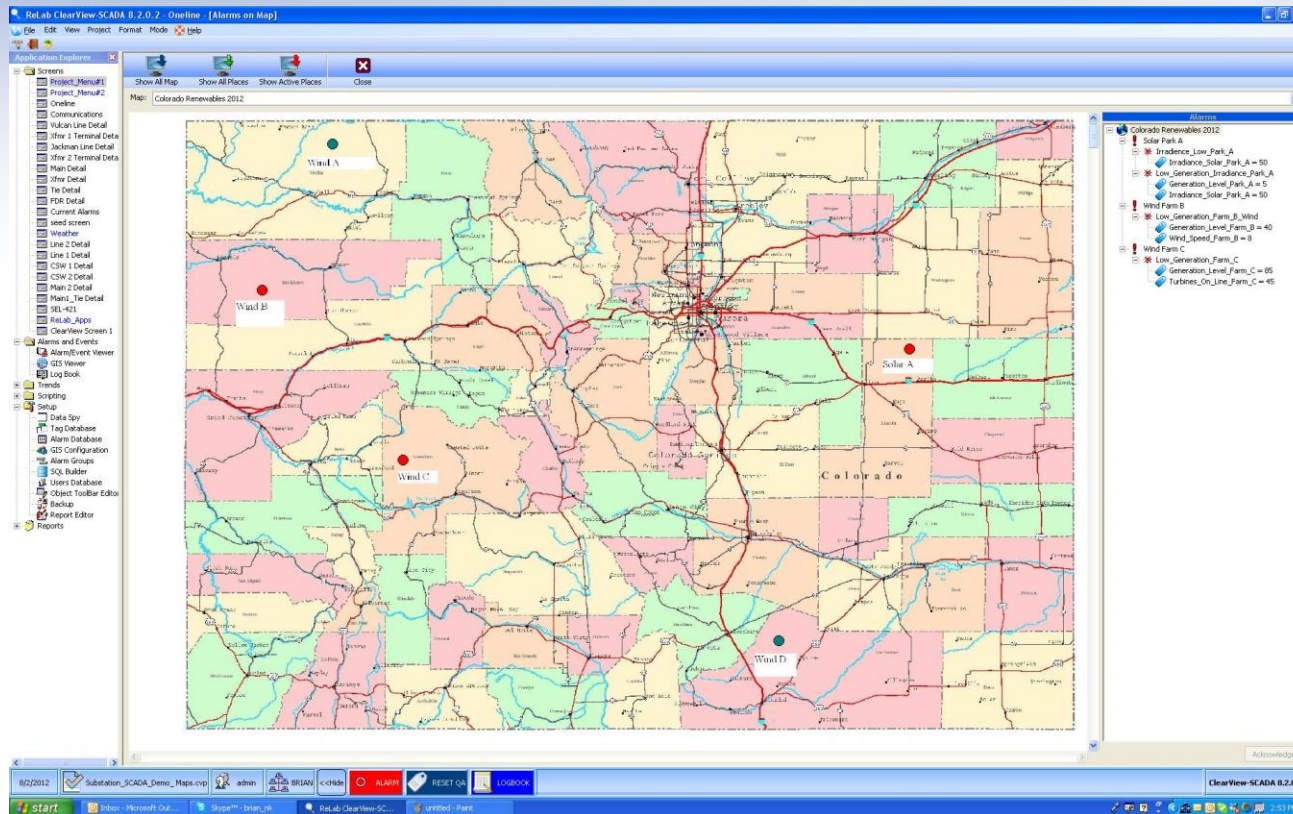
- Geographical Information System (GIS) option available for ClearView
 - Provides overview for geographically dispersed assets
- Alarm Driven
 - Displays Alarm Condition and Status
 - Displays tags associated with Alarm Condition
- Maps can be imported from multiple file formats
 - Format: .bmp, .dgn, .dxf, .jpeg, .png, .shp, .tif/tiff, .ttkjp
- Sites and connections can be configured on the map
- Zoom and Pan Features Available
- Applications
 - Monitoring and remote SCADA for renewable generation
 - Master SCADA for control room with multiple substations
 - Fault location and isolation for Utility SCADA solar and wind generation plants
- Can be combined with ClearView Enterprise SCADA Server

- Asset Management – Independent Assets
 - 4 Wind Farms
 - 1 Solar Park
 - No connectivity between generation sites
- ClearView Client with standard ClearView application
 - Can be used on a PC

No Alarms

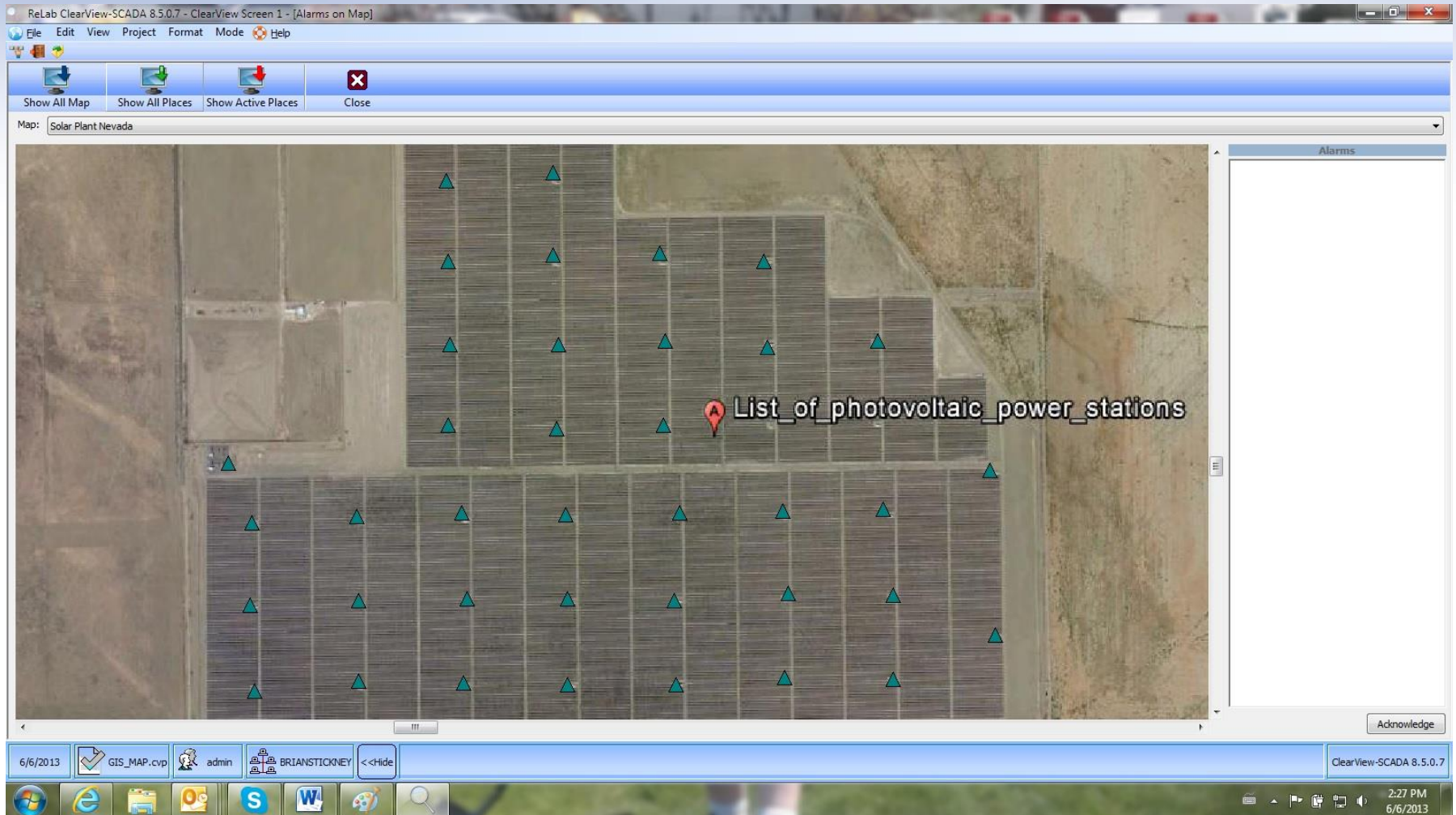


Active Alarms

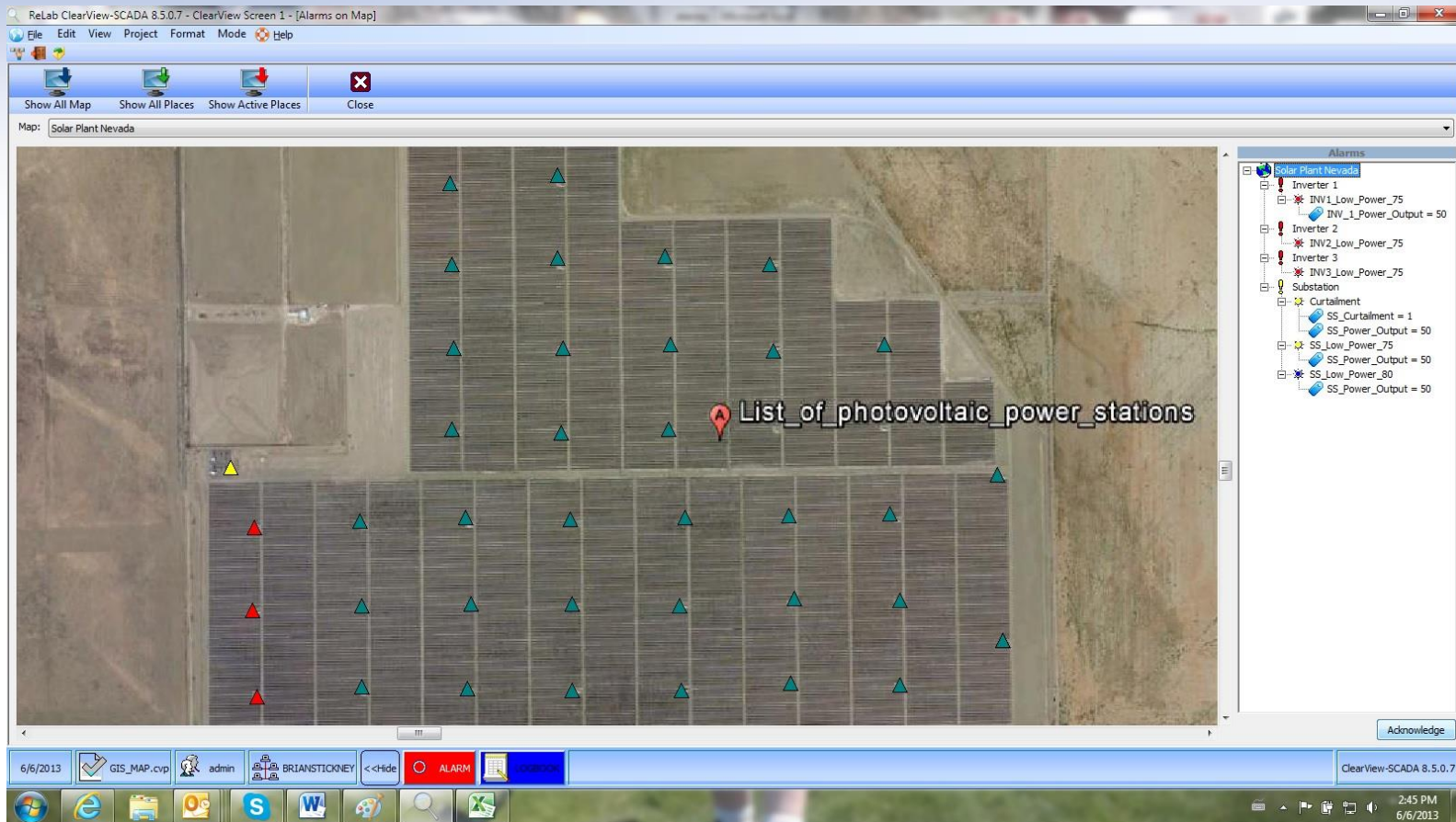


- Displays alarm
- Displays analog values associated with Alarm with current data

PV Plant No Alarms



Curtailment with Inverter Shutdown



Three Inverter Stations Shut Down as part of Curtailment Condition

Alarms Curtailment Condition

ReLab ClearView-SCADA 8.5.0.7 - ClearView Screen 1 - [Alarm/Event Viewer]

File Edit View Project Format Mode Help

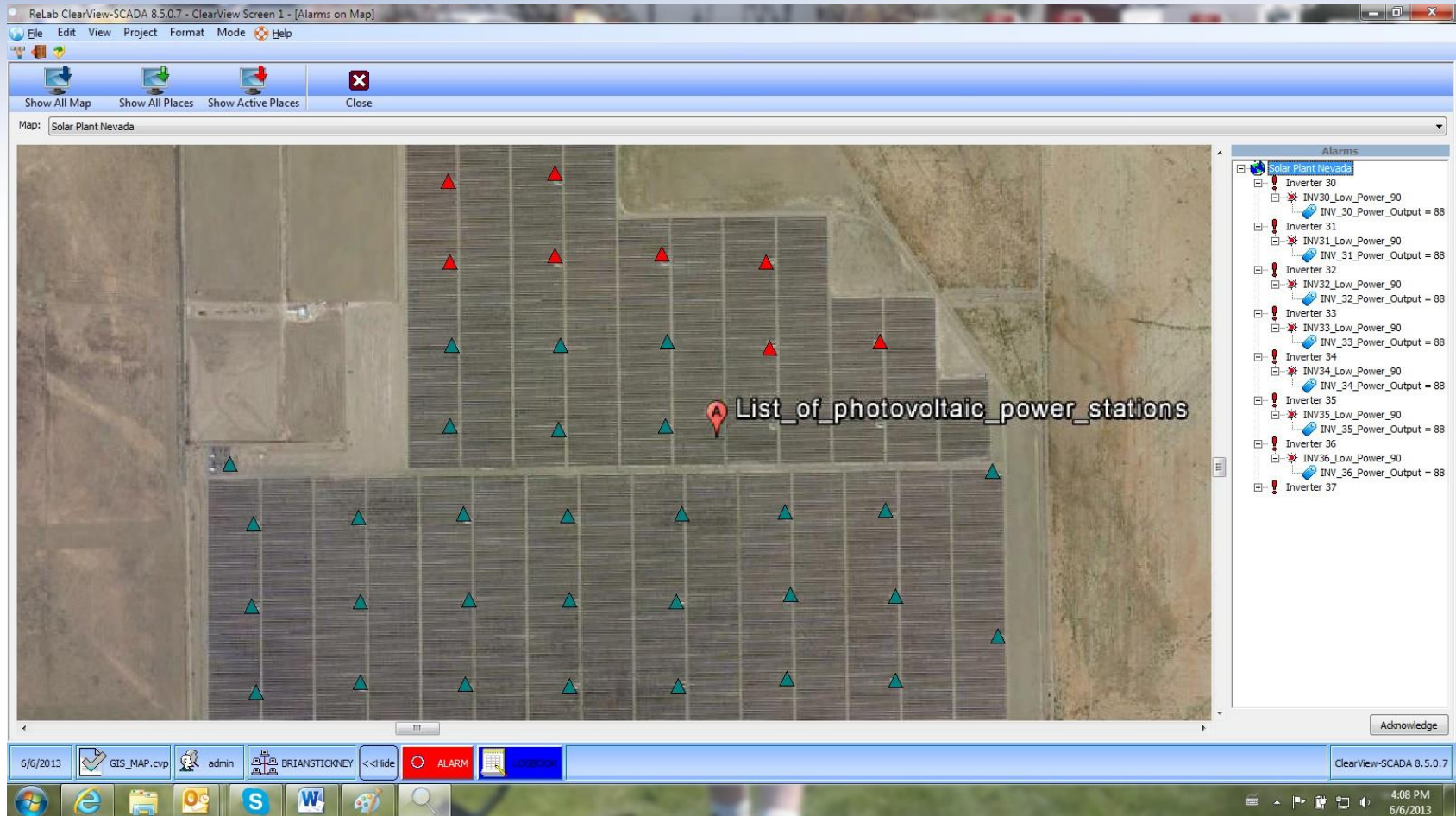
Alarms Ack All All Alarm History Events Security Interval Refresh Close

Alarm Time	ACK Time	Cleared Time	Alarm Name	Description	Severity	Group	User	Value
13/06/06 02:35:25:950 PM	13/06/06 02:35:58:374 PM		SS_Low_Power_75	Power Output below 75%	Critical	Substation		
13/06/06 02:31:22:112 PM		13/06/06 02:35:25:950 PM	SS_Low_Power_80	Power Output Below 80%	Priority-1	Substation		
13/06/06 02:30:44:583 PM	13/06/06 02:36:02:945 PM		Curtailment	Curtailment Status	Critical	Substation		
13/06/06 02:43:35:893 PM			INV3_Low_Power_75	Inverter Power Output Below 75%	Critical	Inverter		50
13/06/06 02:42:46:525 PM			INV2_Low_Power_75	Inverter Power Output Below 75%	Critical	Inverter		50
13/06/06 02:42:20:048 PM			INV1_Low_Power_75	Inverter Power Output Below 75%	Critical	Inverter		50

6/6/2013 GIS_MAP.cvp admin BRIANSTICKNEY <<Hide ALARM ClearView-SCADA 8.5.0.7

6/6/2013 2:46 PM 6/6/2013

Region Event Low Power



Possible Cloud Cover issue, correlate with weather station

Region Alarm Event



ReLab ClearView-SCADA 8.5.0.7 - ClearView Screen 1 - [Alarm/Event Viewer]

File Edit View Project Format Mode Help

Alarms Ack All Alarm History Events Security Interval Refresh Close

Alarm Time	ACK Time	Cleared Time	Alarm Name	Description	Severity	Group	User	Value
13/06/06 04:07:28:687 PM			INV37 Low Power 90	Inverter Power Output below 90%	Warning	Inverter		88
13/06/06 04:07:28:687 PM			INV37 Low Power 90	Inverter Power Output below 90%	Warning	Inverter		88
13/06/06 04:07:21:074 PM			INV36 Low Power 90	Inverter Power Output below 90%	Warning	Inverter		88
13/06/06 04:07:12:450 PM			INV35 Low Power 90	Inverter Power Output below 90%	Warning	Inverter		88
13/06/06 04:07:04:850 PM			INV34 Low Power 90	Inverter Power Output below 90%	Warning	Inverter		88
13/06/06 04:06:57:241 PM			INV33 Low Power 90	Inverter Power Output below 90%	Warning	Inverter		88
13/06/06 04:06:50:141 PM			INV32 Low Power 90	Inverter Power Output below 90%	Warning	Inverter		88
13/06/06 04:06:28:845 PM			INV31 Low Power 90	Inverter Power Output below 90%	Warning	Inverter		88
13/06/06 04:06:18:706 PM			INV30 Low Power 90	Inverter Power Output below 90%	Warning	Inverter		88

6/6/2013 GIS_MAP.cvp admin BRIANSTICKNEY <<Hide ALARM

ClearView-SCADA 8.5.0.7

4:09 PM 6/6/2013

Alarm Database Substation



Relab ClearView SCADA 8.2.0.2 - Project Menu/1 - [Alarm Database]

File Edit View Project Format Mode Help

Online COMMUNICATION WEATHER ALARMS ALARM HISTORY SEL-421 Relab APP's LOGIN LOGOUT Shutdown

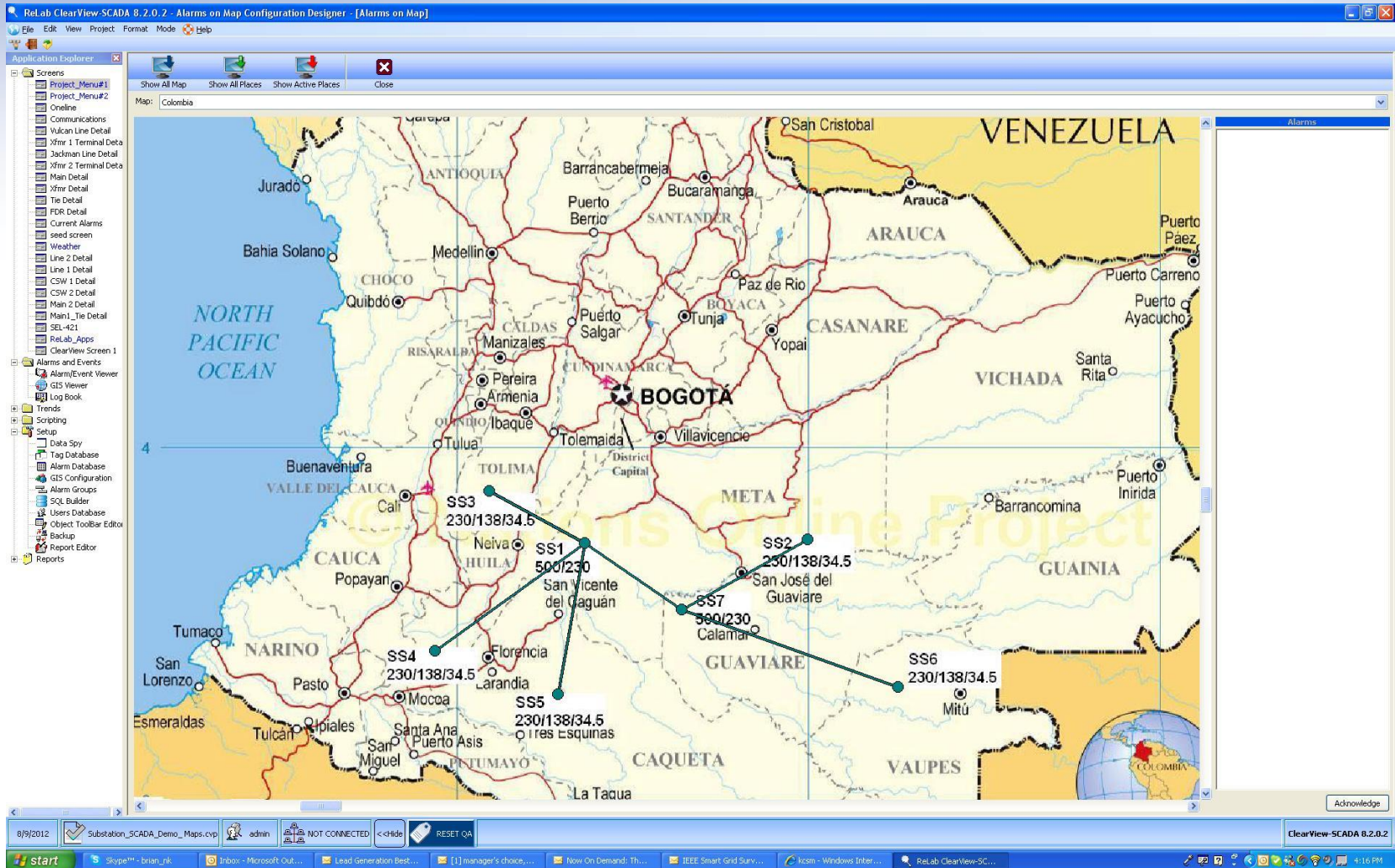
User: admin 8/10/2012 2:17:27 PM Enter Filter Here...

Drag a column header here to group by that column.

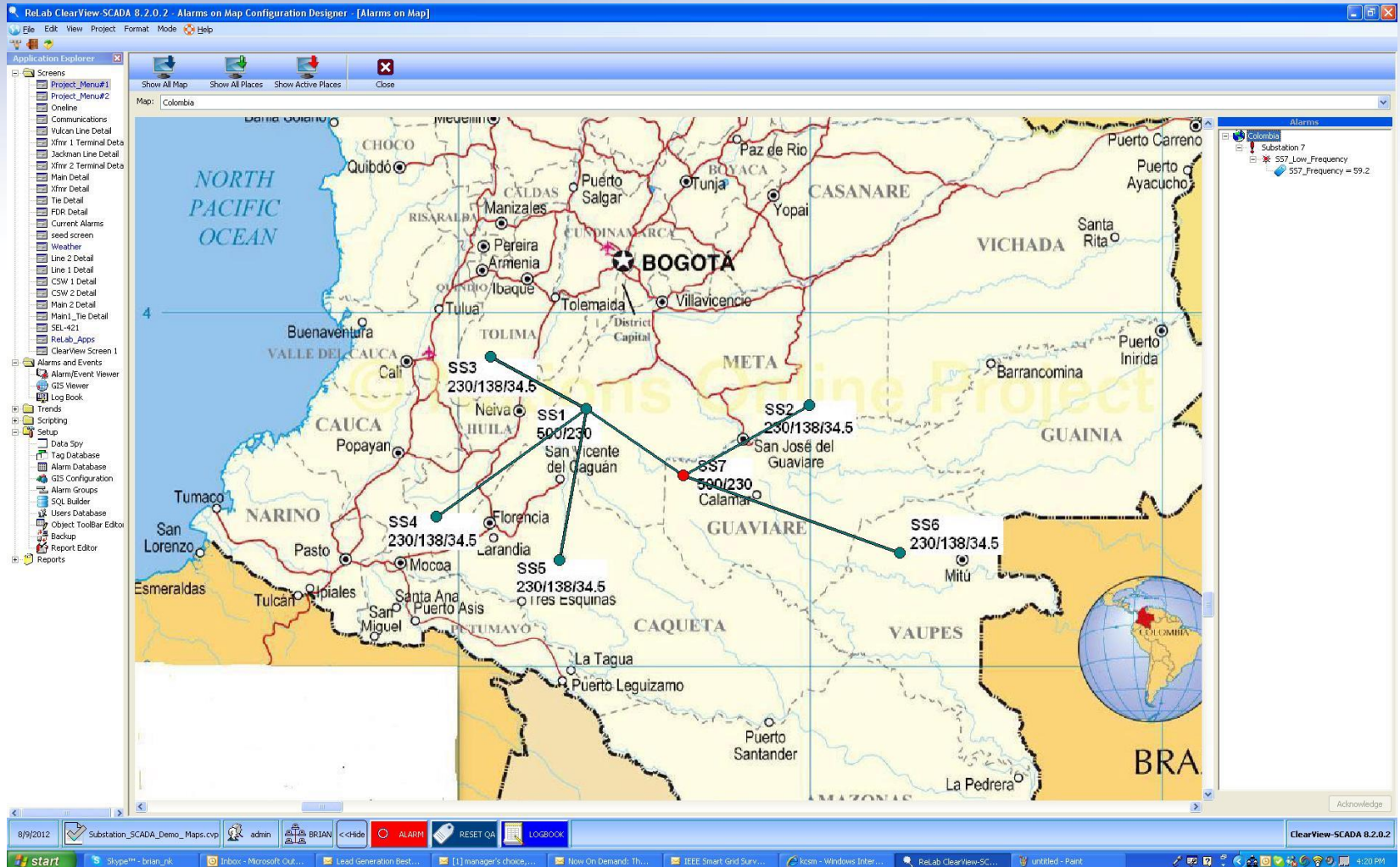
Name	Description	Condition	Severity	Alarm Group	Enabled
Low_Generation_Farm_D_Wind	low generation wind speed	Wind_Speed_Farm_D < 12.0	Warning	<input type="checkbox"/>	<input type="checkbox"/>
Curtailment_Solar_Park_A	Curtailment Setting	Curtailment_Solar_Park_A is ON	Warning	<input type="checkbox"/>	<input type="checkbox"/>
OFFLINE_Solar_Park_A	generation off line	OFFLINE_Solar_Park_A is ON	Warning	<input type="checkbox"/>	<input type="checkbox"/>
Irradiance_Low_Park_A	low irradiance	Irradiance_Solar_Park_A < 65.0	Warning	<input type="checkbox"/>	<input type="checkbox"/>
Low_Generation_Irradiance_Park_A	low generation irradiance	Irradiance_Solar_Park_A < 65.0	Warning	<input type="checkbox"/>	<input type="checkbox"/>
Low_Generation_Inverter_Park_A	Low generation inverters off line	Inverters_Solar_Park_A < 75.0	Warning	<input type="checkbox"/>	<input type="checkbox"/>
Low_Generation_String_Park_A	low generation string box failures	String_Boxes_Solar_Park_A < 74.0	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS1_Over_Current	Over Current Alarm	SS1_Current > 1000.0	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS1_Under_Voltage	Under Voltage Alarm	SS1_Voltage < 210000.0	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS1_Low_Frequency	Low Frequency Alarm	SS1_Frequency < 59.5	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS1_High_Frequency	High Frequency Alarm	SS1_Frequency > 60.5	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS1_Breaker_Status	Breaker Open	SS1_Breaker_Status is OFF	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS1_Auto_Redclose_Failure	Auto Redclose Procedure Failed	SS1_Redclose_Failure is ON	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS2_Over_Current	Over Current Alarm	SS2_Current > 1000.0	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS2_Under_Voltage	Under Voltage Alarm	SS2_Voltage < 210000.0	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS2_Low_Frequency	Low Frequency Alarm	SS2_Frequency < 59.5	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS2_High_Frequency	High Frequency Alarm	SS2_Frequency > 60.5	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS2_Breaker_Status	Breaker Open	SS2_Breaker_Status is OFF	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS2_Auto_Redclose_Failure	Auto Redclose Procedure Failed	SS2_Redclose_Failure is ON	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS3_Over_Current	Over Current Alarm	SS3_Current > 1000.0	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS3_Under_Voltage	Under Voltage Alarm	SS3_Voltage < 210000.0	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS3_Low_Frequency	Low Frequency Alarm	SS3_Frequency < 59.5	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS3_High_Frequency	High Frequency Alarm	SS3_Frequency > 60.5	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS3_Breaker_Status	Breaker Open	SS3_Breaker_Status is OFF	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS3_Auto_Redclose_Failure	Auto Redclose Procedure Failed	SS3_Redclose_Failure is ON	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS4_Over_Current	Over Current Alarm	SS4_Current > 1000.0	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS4_Under_Voltage	Under Voltage Alarm	SS4_Voltage < 210000.0	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS4_Low_Frequency	Low Frequency Alarm	SS4_Frequency < 59.5	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS4_High_Frequency	High Frequency Alarm	SS4_Frequency > 60.5	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS4_Breaker_Status	Breaker Open	SS4_Breaker_Status is OFF	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS4_Auto_Redclose_Failure	Auto Redclose Procedure Failed	SS4_Redclose_Failure is ON	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS5_Over_Current	Over Current Alarm	SS5_Current > 1000.0	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS5_Under_Voltage	Under Voltage Alarm	SS5_Voltage < 210000.0	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS5_Low_Frequency	Low Frequency Alarm	SS5_Frequency < 59.5	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS5_High_Frequency	High Frequency Alarm	SS5_Frequency > 60.5	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS5_Breaker_Status	Breaker Open	SS5_Breaker_Status is OFF	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS5_Auto_Redclose_Failure	Auto Redclose Procedure Failed	SS5_Redclose_Failure is ON	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS6_Over_Current	Over Current Alarm	SS6_Current > 1000.0	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS6_Under_Voltage	Under Voltage Alarm	SS6_Voltage < 210000.0	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS6_Low_Frequency	Low Frequency Alarm	SS6_Frequency < 59.5	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS6_High_Frequency	High Frequency Alarm	SS6_Frequency > 60.5	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS6_Breaker_Status	Breaker Open	SS6_Breaker_Status is OFF	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS6_Auto_Redclose_Failure	Auto Redclose Procedure Failed	SS6_Redclose_Failure is ON	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS7_Over_Current	Over Current Alarm	SS7_Current > 1000.0	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS7_Under_Voltage	Under Voltage Alarm	SS7_Voltage < 210000.0	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS7_Low_Frequency	Low Frequency Alarm	SS7_Frequency < 59.5	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS7_High_Frequency	High Frequency Alarm	SS7_Frequency > 60.5	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS7_Breaker_Status	Breaker Open	SS7_Breaker_Status is OFF	Warning	<input type="checkbox"/>	<input type="checkbox"/>
SS7_Auto_Redclose_Failure	Auto Redclose Procedure Failed	SS7_Redclose_Failure is ON	Warning	<input type="checkbox"/>	<input type="checkbox"/>

8/10/2012 Substation_SCADA_Demo_Maps.cvp admin NOT CONNECTED <crd> RESET QA ClearView-SCADA 8.2.0.2

Asset Map No Alarms



Single Substation Alarms



Multiple Substation Alarm Conditions

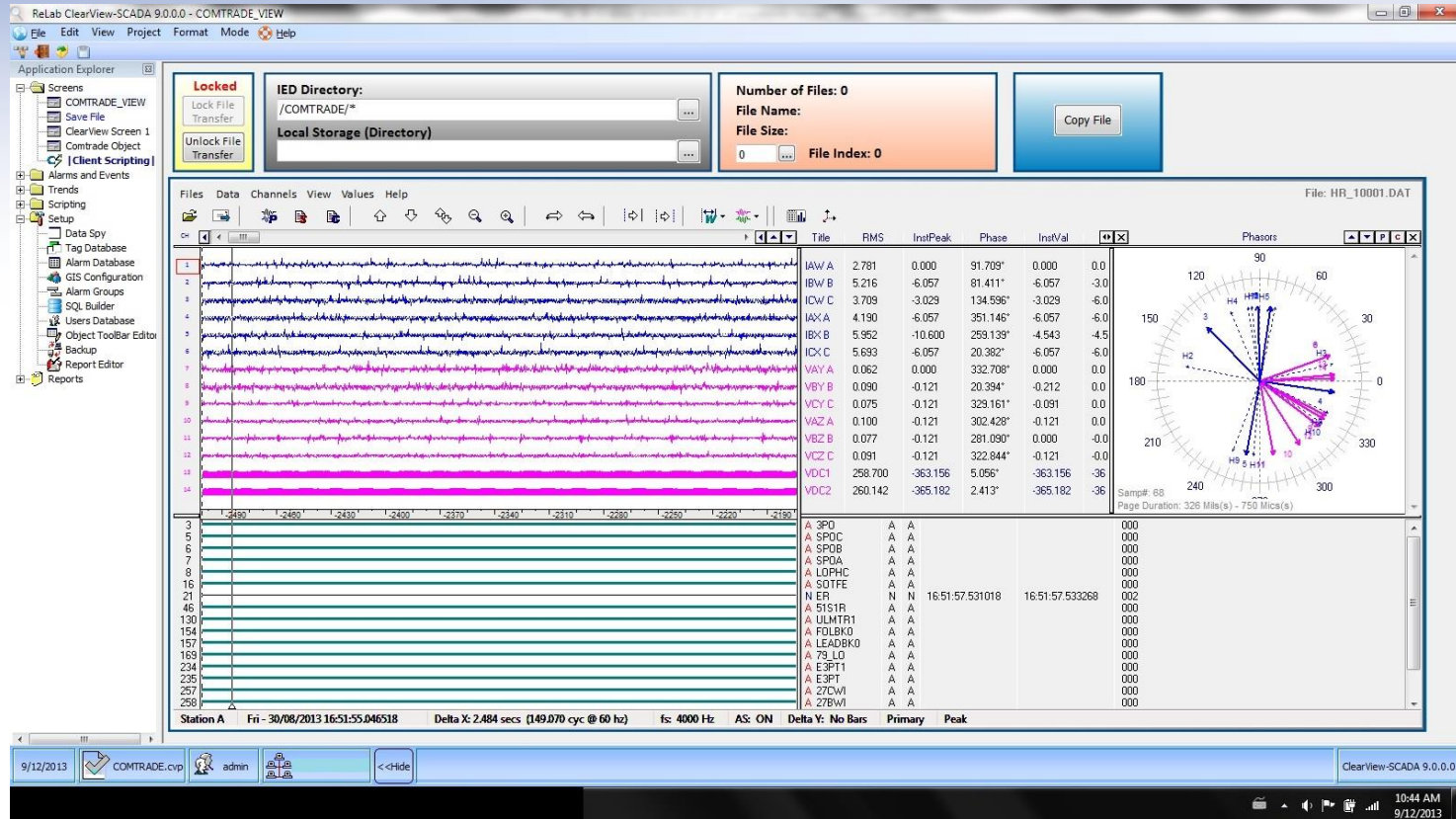


Comtrade File Viewer



- Object to view oscillographic records
 - System disturbances
 - Faults
- Automated collection of files by FTP File Transfer per IEC-61850-8-1

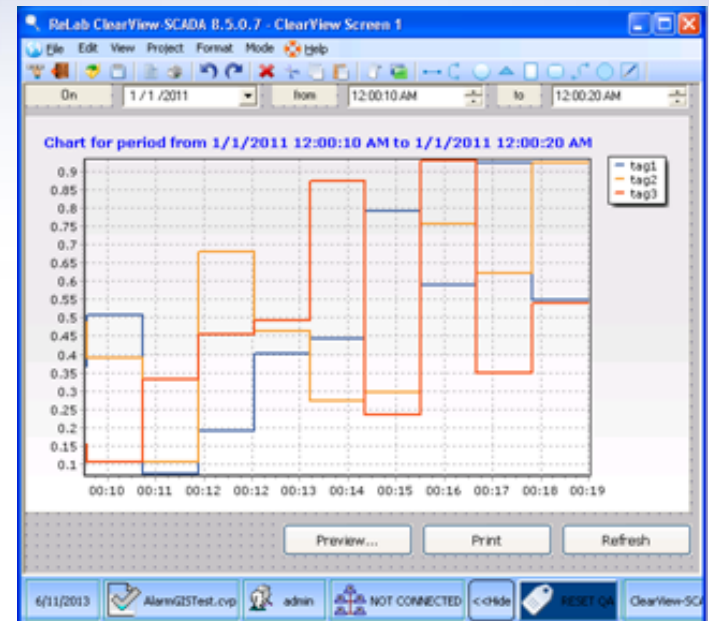
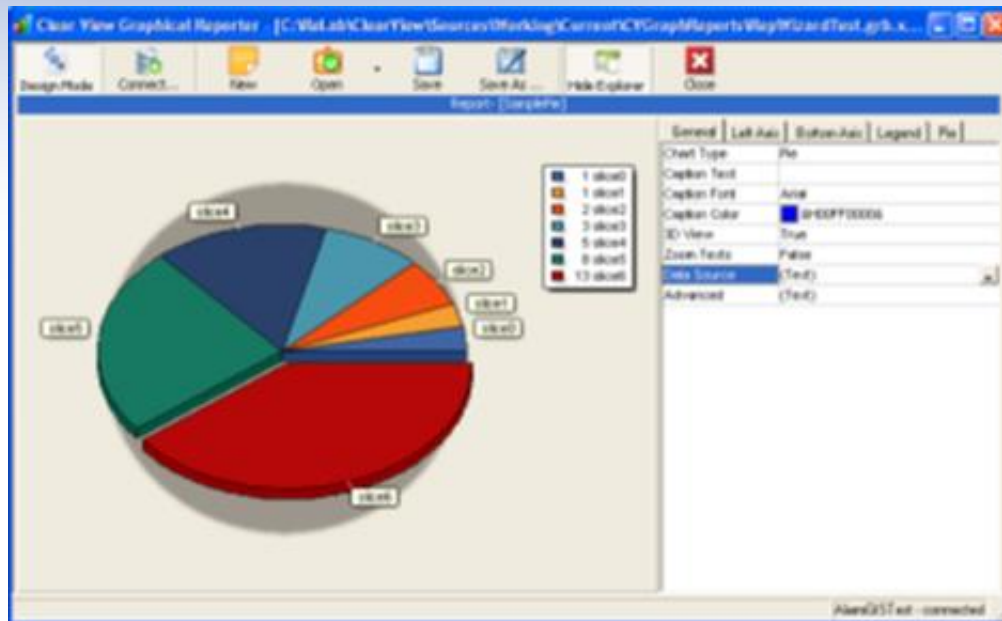
Automated Comtrade File Viewer



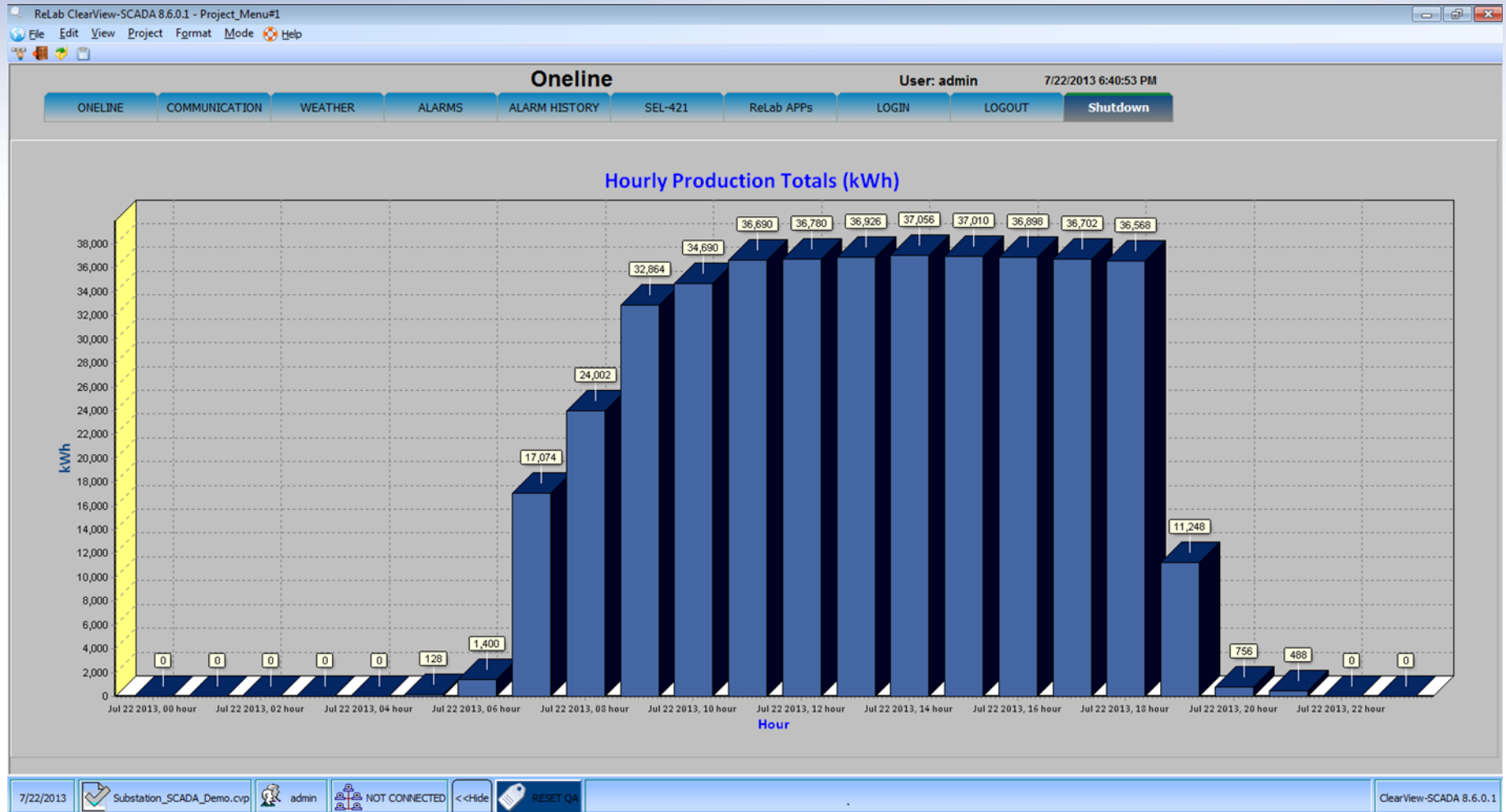
- Object to view oscillographic records (System disturbances & Faults)
- Automated collection of files by FTP File Transfer per IEC-61850-8-1

- Pie, Bar, Area and Line Charts
- Conversion of tabular data into graphical format
- Application Examples
 - Energy production
 - Load Consumption
 - Wind Velocity over time or by location
 - Irradiance over time or by location
 - Parameter Change (V, I, Frequency, Active and Reactive Power, Angle)
 - Equipment Performance/Characteristics
 - Comparison of Assets for Enterprise Level Applications

Chart Examples



Application Example



ReLab OPC Server (RLOPC)



- Unique performance and reliability
- Thousands of tags
- High update rates

Protocols:

- SEL OPC Driver (All SEL protocols)
- Synchrophasor IEEE 37.118 Driver (PMU)
- Synchrophasor IEEE 37.118 Driver (PDC)
- Modbus Driver
- Simulation Driver
- IEC 61850 Driver (MMS)
- IEC 61850 Driver (Goose)

We budgeted two weeks of work to configure the other vendor's IEC 61850 solution.

With your IEC 61850 OPC Server we were able to configure the entire system in 6 hours.

A great product with exceptional support

Dorran Bekker, Consolidated Power Projects

- Advantages
 - Simple to use -- Doesn't require deep IEC 61850 knowledge
 - Rapid configuration – Devices configurable in 10 minutes
 - Scalable – From a single device to a large geographic area with many devices
 - Truly Interoperable – Multi-vendor support
 - Low cost-of-ownership with fast ROI
 - Getting maximum of IEC 61850 performance
- Functionality
 - Utilizes protocol self-describing capabilities
 - Supports IEC 61850 buffered and un-buffered reports
 - Mapping of all data types
 - Real device quality and timestamp of OPC meter and status values
 - Hides complexity of IEC 61850 writes

- Self initializing Read IED Goose control block configuration via. IEC 61850 MMS
- Initialize with simple and intuitive XML description configuration file
- Easily to configure and therefore provides reliable gateway into Goose network
- Fast and simple IED >> PC >> IED communication

- Wide range of advanced applications
 - Substation Automation
 - IEC-61850 Substation Automation
 - Synchrophasor implementation
 - Global Presence – ReLab Software products are running around the world
- Product implementation is fast and painless
 - Ease-of-use, designed for the non-programmer
 - Minimal training required
 - Robust design with high reliability
- Low Cost-of-Ownership and Fast Return-on-Investment
 - Priced per instance/computer
 - Very high Performance/Price ratio
 - Scalable