

POWERAPPS



About KALKITECH

- Inception in May,1998 (four people, one room office)
- 31st March 2010, 160 people with 140 engineers.
- Offices in India, UAE and USA.
- ISO 9001:2008 certified quality system.
- Focus on Power, Oil & Gas, Renewable Energy Sector
- Partners in four continents, customers in 40+ countries.

About PowerApps

PowerApps is an integrated Power Systems Analysis Software & Simulation package that includes the Graphic User Interface, Data Base Manager, and Electrical Equipment Parameter Estimation for creating the Network one-line diagram and associated database. PowerApps offers both graphical and tabular data entry modes, user-preferred single-line diagram drawing options and sophisticated facilities for reporting, plotting and customizing the simulation reports. The design of PowerApps recognizes the fact that there is no memory restriction in present day computers. Consequently PowerApps has no built in dimensioned variables. The needed memory for analysis of any system is allocated dynamically during execution time.

Introduction

- This presentation gives an overview about PowerApps and its general features.
- This presentation further help users to learn how to use PowerApps while performing different types of analysis.

PowerApps Outline

Section 1: Installation and General Features of PowerApps

- ◆ Steps to install PowerApps and overview about the user interface of PowerApps.

Section 2: SLD Creation

- ◆ Procedure for creation of SLD and to enter the data in PowerApps.

Section 3: Execution in PowerApps

- ◆ Steps to execute different types of analysis available.

PowerApps Outline

→ **SECTION 1: Installation and General Features of PowerApps**

→ SECTION 2: SLD Creation

→ SECTION 3: Execution in PowerApps

Section 1: Objectives

- Steps to install and uninstall PowerApps.
- Familiarize users of PowerApps with its user interface.
- Give users an overview about the features of PowerApps.

Installation

- **Installing PowerApps for Windows**

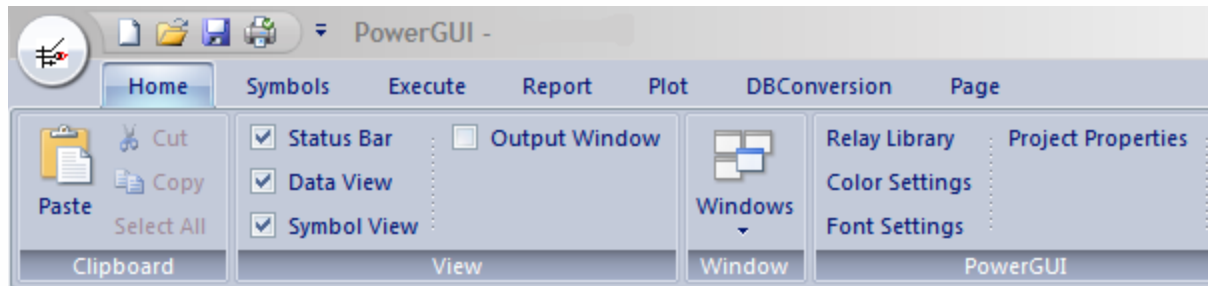
- To install execute the Setup.exe provided.
- This will install PowerApps1.0 and PowerGUI.

- **Uninstalling PowerApps for windows**

- Go to Control Panel → Add/Remove programs → Click PowerApps 1.0 → Uninstall.

User Interface

- PowerApps UI consists of a ribbon across the top of the program.



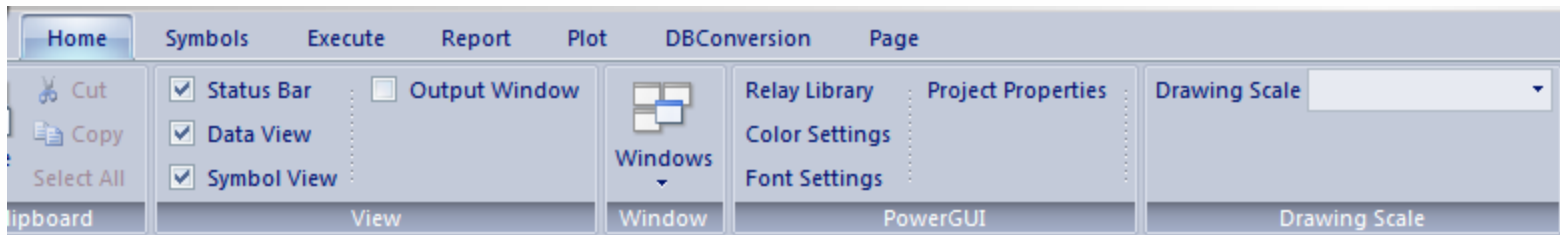
- PowerApps window also has, Quick Access tool bar in the title bar, and Status bar at the bottom.



PowerGUI Messages X = <31> Y = <166> scale = 1.000000 xe = 933 ye = 1320; PowerGUI; Drawing1

User Interface

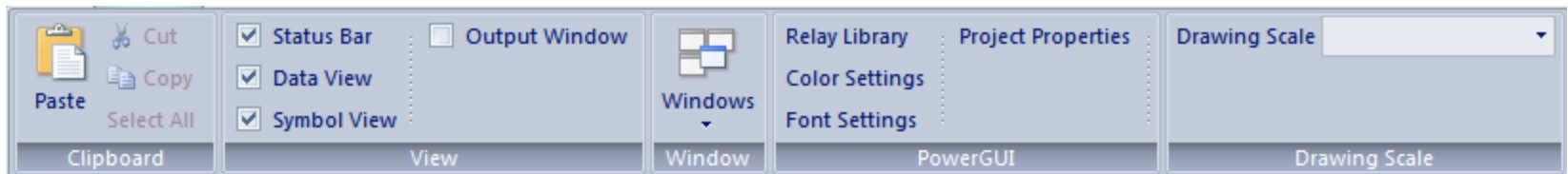
- Tabs in the ribbon are designed in such a way that the number of times the user has to switch between tabs is minimized.
- In every tab similar icons are grouped together in a Ribbon group.
- PowerApps has the following ribbon tabs Home, Symbols, Execute, Report, Plot, DBConversion, and Page.



User Interface

Home tab:

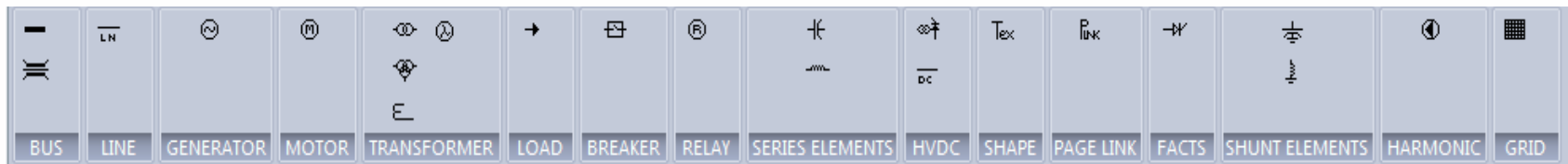
- It has the following ribbon groups Clipboard, View, PowerGUI, and Drawing Scale.
 - Clipboard group is for editing the drawing.
 - View group can select the type of windows to be visible.
 - PowerGUI group consists of buttons with which user can modify any type setting related to PowerGUI.
 - Drawing scale group is used change the scale of drawing area.



User Interface

Symbols tab:

- It consists of all the symbols that correspond to an element available in PowerApps.
- This tab has been divided into groups based on the properties of each element.



User Interface

Execute tab:

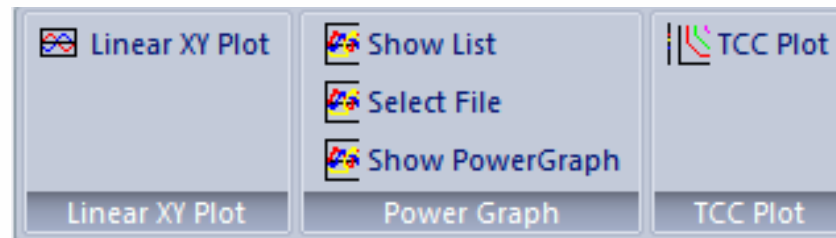
- This tab gives user access to all the settings and options related to execution of PowerApps.
- Study cases, disturbance scenarios and events are to be specified from here.
- General Parameters for PowerApps can be set from the Execute tab.

CASEDES	General Parameters Active Power Demand	Load Frequency control	Disturbance Scenario	Event	Configuration PLOT Option	Execute Analysis	START STOP	Exclude Relay Pair Undefined Relay Pair
Case Description	General Parameters	Load Frequency Control	Disturbance Scenario	Event	Real Time Plotting	Execute Analysis	Real Time Scheduling	Relay Co-ordination

User Interface

Plot tab

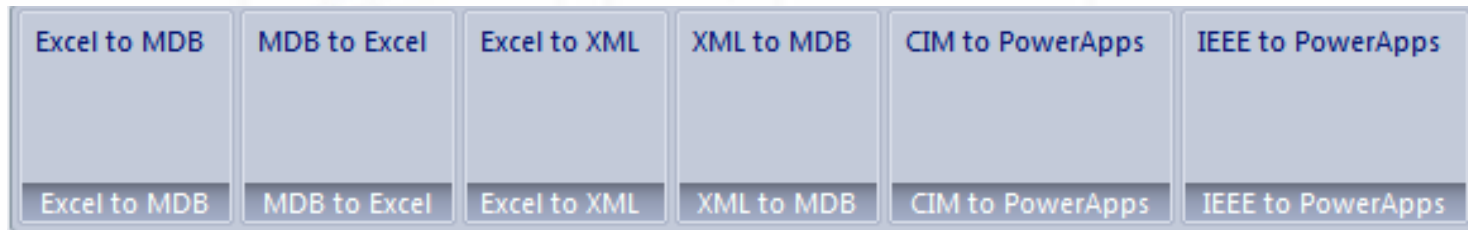
- If plots are available for a study, user can view all the plots from this tab.
- User can either select from available graphs or select a graph file.
- There is also an option for TCC plot.



Section 1: User Interface

DBConversion tab

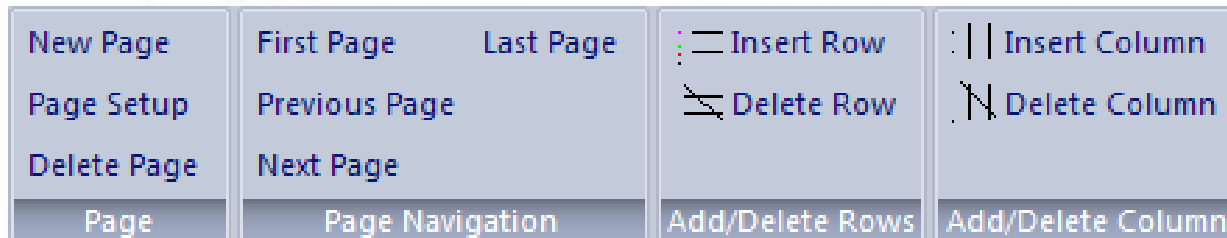
- PowerApps gives its users, the option to convert the data into most commonly used formats.



User Interface

Page tab

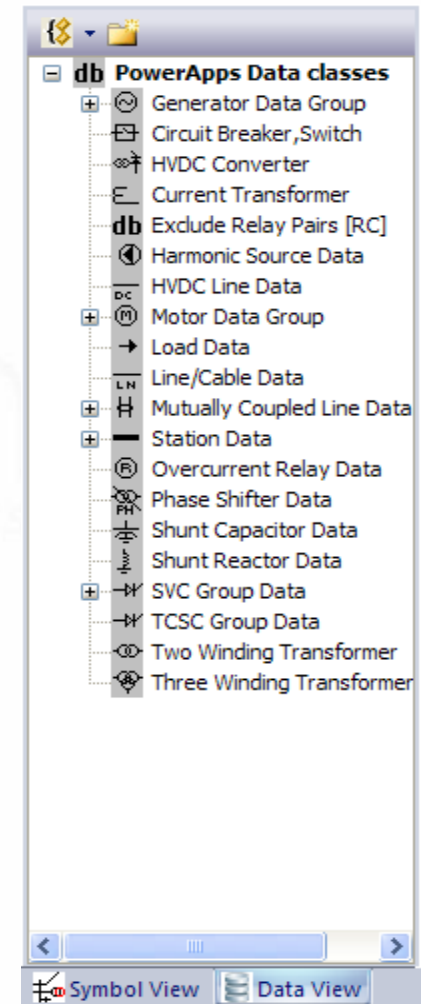
- Using this tab user can add, delete, change size, and alter orientation of pages in the project.
- User can also navigate pages in the project from this tab.



User Interface

Data View

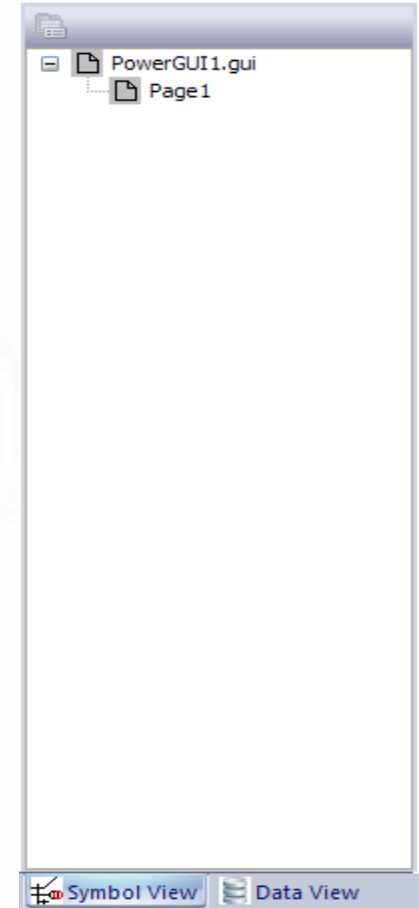
- Users can use Data View to construct SLD without drawing the same.
- Data view saves time for the user by allowing to create SLD by only adding data into symbol.



User Interface

Symbol View

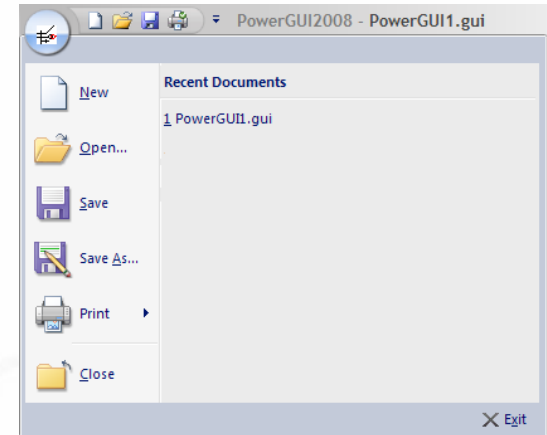
- It is basically a tree with Project at the top and then followed by the pages in the project.
- Under each page there are elements present in each page.
- Using this view user can easily edit properties of an element without navigating through pages.



User Interface

PowerGUI File Menu

- The PowerGUI File menu is used to open and save PowerGUI projects, to create new PowerGUI projects, to print and to exit PowerGUI. To access this menu you must click on the PowerGUI button in the upper-left corner of the program.
- File menu also displays recently accessed PowerGUI projects.



PowerGUI button

User Interface

Quick Access Tool-bar



- The Quick Access Tool-bar provides users with quick access to the most frequently used buttons. These buttons are found in the top left portion of the Ribbon just to the right of the PowerGUI Button. The default buttons that appear in the Quick Access Tool-bar are shown in the figure.
- The Quick Access Tool-bar can also be customized very simply. If users find a button that they would like quicker access to, simply right-click on the button and then choose Add to Quick Access Tool-bar. The small icon version of the button will then immediately appear up in the Quick Access Tool-bar.
- The Quick Access Tool-bar can also be modified to show the Tool-bar Below the Ribbon providing more space for specifying buttons.

PowerApps Modules

- Load Flow Studies
- Short Circuit Studies [ANSI/IEEE/IEC 60909/Conventional methods]
- Relay Coordination [Overcurrent Phase/Earth Fault/Distance Relays]
- Harmonic Measurements, Analysis, Filter Design
- Transient Stability Analysis
- Insulation Coordination Studies
- Motor Starting Studies
- Economic Load Dispatch
- Single Area Load Frequency Control

→ SECTION 1: Installation and General Features of PowerApps

→ SECTION 2: SLD Creation

→ SECTION 3: Execution in PowerApps

Section 2: Objectives

- Open existing PowerGUI 2008 Projects
- Create new PowerGUI 2008 Projects i.e. create single line diagram (SLD).
- Entering the data using SLD, data view.



Opening PowerGUI

- To begin, double-click on the PowerGUI icon. PowerGUI is used to create new projects, modify existing projects, and to carry out power systems studies.



Open Project

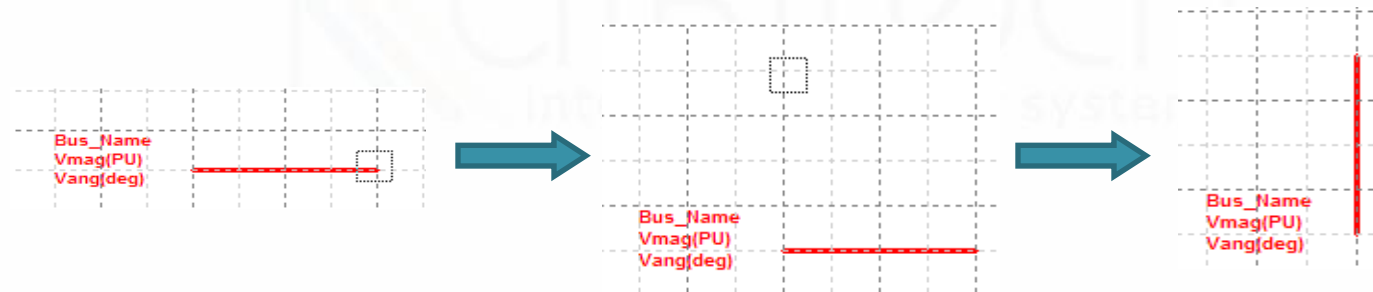
- The most common first step in using PowerGUI is to open a project. To open a case, either select it from the list of recently opened projects or Select Open from the Application Button to display the Open Dialog.
- In the Type of Files box, select the desired file type. By default, the PowerGUI 2008 type is selected (*.gui).
- Click OK.
- Existing projects can also be opened by directly double clicking on the project file (.gui).

Create Project

- To create a new project, select New from the PowerGUI menu at the upper left corner of the program.
- Single line diagrams (SLD) are used in power system analysis to represent the actual three-phase power system using a single line to represent each three-phase device.
- SLD is to be drawn in the area below the ribbon, which is covered with grid lines.

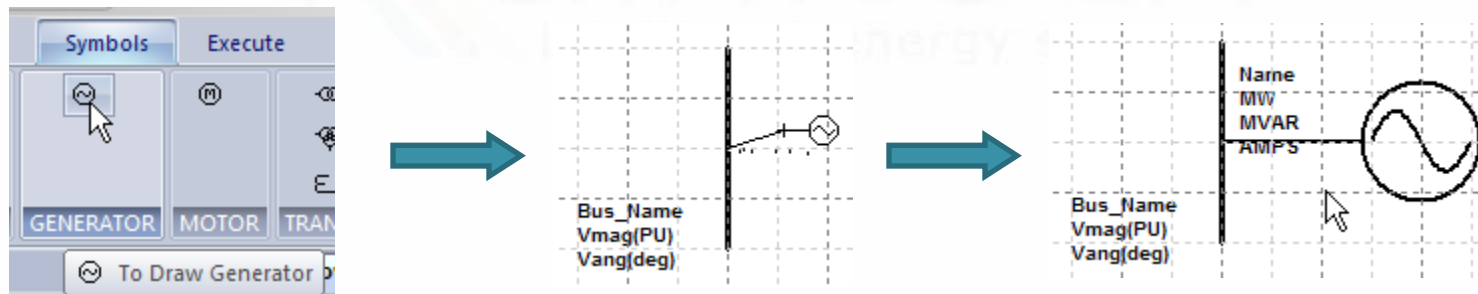
Draw a Bus

- To draw a bus, click on the bus symbol in the Symbols tab and then click on the drawing area.
- By default the bus drawn will be in horizontal direction. To make it vertical, click and hold on one end of the bus and then drag it by 90° and leave it.



Draw A Generator

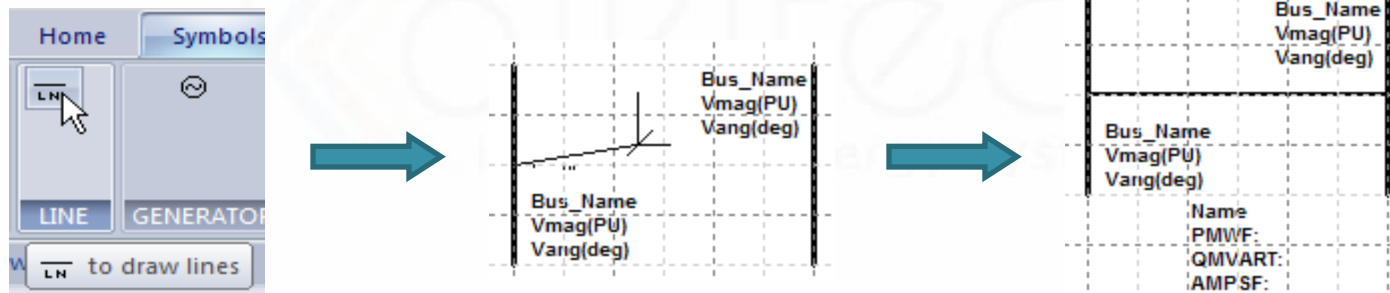
- Generator has to be connected to a bus.
- Select the generator by clicking on the generator symbol in the symbols tab.
- Click on a bus and drag the pointer. Click one more time to draw the generator.



- Motor, Shunt Elements, Loads can be drawn similarly.

Draw a Line

- Line is to be drawn to connect any two buses.
- To draw a line, Click on the Line symbol in the symbols tab then click on one bus and then the other bus. A line will be drawn between the buses.

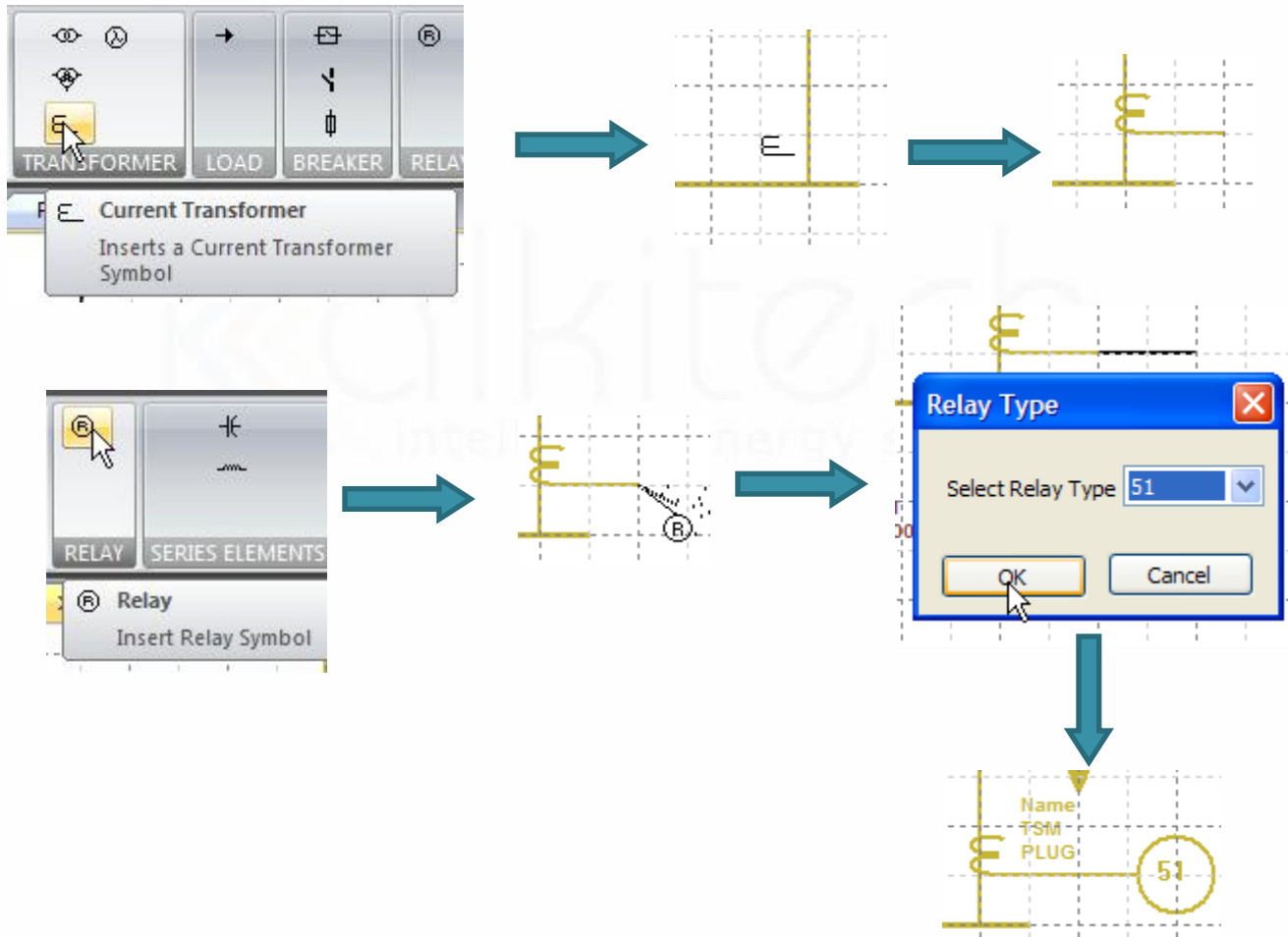


- Transformers, Series Elements, Breakers, HVDC lines are drawn in similar way.

Draw a CT & Relay

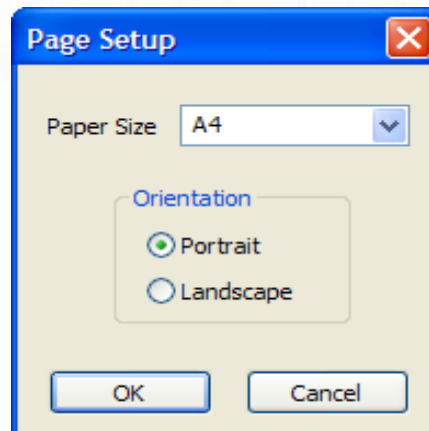
- CT's and relays are necessary for relay coordination studies.
- To draw a CT, click on the CT symbol in the execute tab and place it on a line.
- To draw a Relay, click on the Relay symbol in the execute tab and then click on a CT and drag the pointer. Click one more time to draw the Relay.
- A dialog pops up asking the user to select the type of relay '51' or '51N'. Select anyone and click OK button.

Draw a CT & Relay



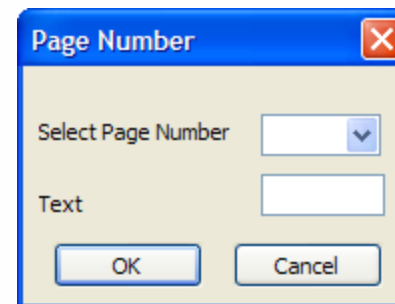
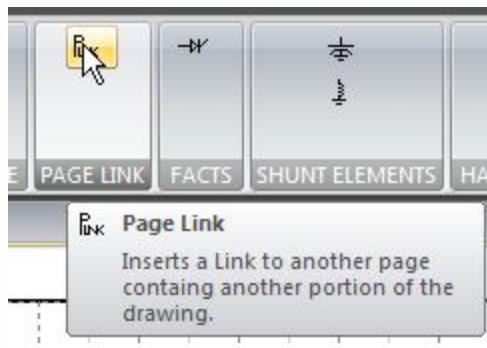
Page Setup

- Page Tab → Page Setup
- To increase the drawing area users can use the Page Setup dialog.
- Paper size and orientation can be changed here.



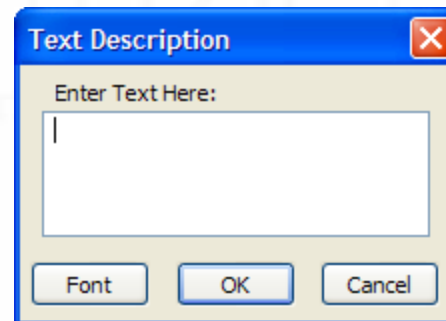
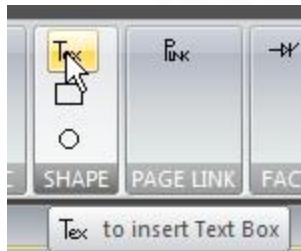
Page Link

- To link SLD spanned over more than one page, page links can be used link the drawing.
- Symbols Tab → Page Link
- Select the Page number and Add a text.
- Do the above step on the other page also.



Text Box

- PowerGUI provides its users facility to add descriptions for SLD using text box.
- Symbols Tab → Text Box.
- Add the required text, change the font if required and click OK.



Entering the Data

- To enter the data into an element users can either Right-Click on the element in the drawing or in the Symbol View.
- Upon a Right-Click a dialog will pop up, fill in the fields and click Save button to save the data into database.
- Users can also load the data from Library, if it is available for that element by clicking the Library button in the dialog.

Database Conversion

- PowerApps supports conversion of system data available in common formats such as IEEE CDF, MS database, XML, CIM to Excel and vice versa.
- User need to click on the type of conversion they want to perform in **DBConversion** menu



SECTION 1: Installation and General Features of PowerApps



SECTION 2: SLD Creation



SECTION 3: Execution in PowerApps

Section 3: Objectives

- Instructions on how to perform each analysis is available in PowerApps.
- Viewing and interpreting results obtained after carrying out study.
- Steps for using PowerGraph to view and manipulate graphs obtained from PowerApps.

Case Description

- To Perform any analysis using PowerApps at least one study case must be added in CASEDES dialog.
 - Execute Tab → CASEDES
- In the dialog box, select any of the available analysis and fill in CaseID, Base CaseID and description about the case. Click on the **ADD** button to add a study case above. There is no limit number of study cases. Now click on study case and check the box at the end and click on **SAVE** button. Only the cases which have been checked will be executed. To modify click on the study case and modify the details and then click on the **Modify** button.

Case Description

Select Analysis ? ✕

Analysis	CaseID	BaseCaseID	Description	Select
----------	--------	------------	-------------	--------

Analysis: Load Flow Case ID: Base Case ID:

Description:

Case Description

- To start execution click on the Execute Analysis button in the Execute menu.
- Analysis will be performed and corresponding message will be displayed in the Output window.
- Results corresponding to the analysis performed will be displayed on the SLD and will be printed out in a text file.
- All the files created while execution will be in the same directory as the project file.

TSA

- For TSA apart from case description users also need to fill in Disturbance Scenarios and Events.
 - Execute Tab → Disturbance Scenario
 - Execute Tab → Event
- User can configure plots for TSA using Configuration and Plot Options.
 - Execute Tab → Configuration
 - Execute Tab → Plot Options.
- Click on the Execute Analysis button to perform TSA.

ELD

- For ELD apart from case description users also need to fill in Active Power Demand.
- Execute Tab → Active Power Demand

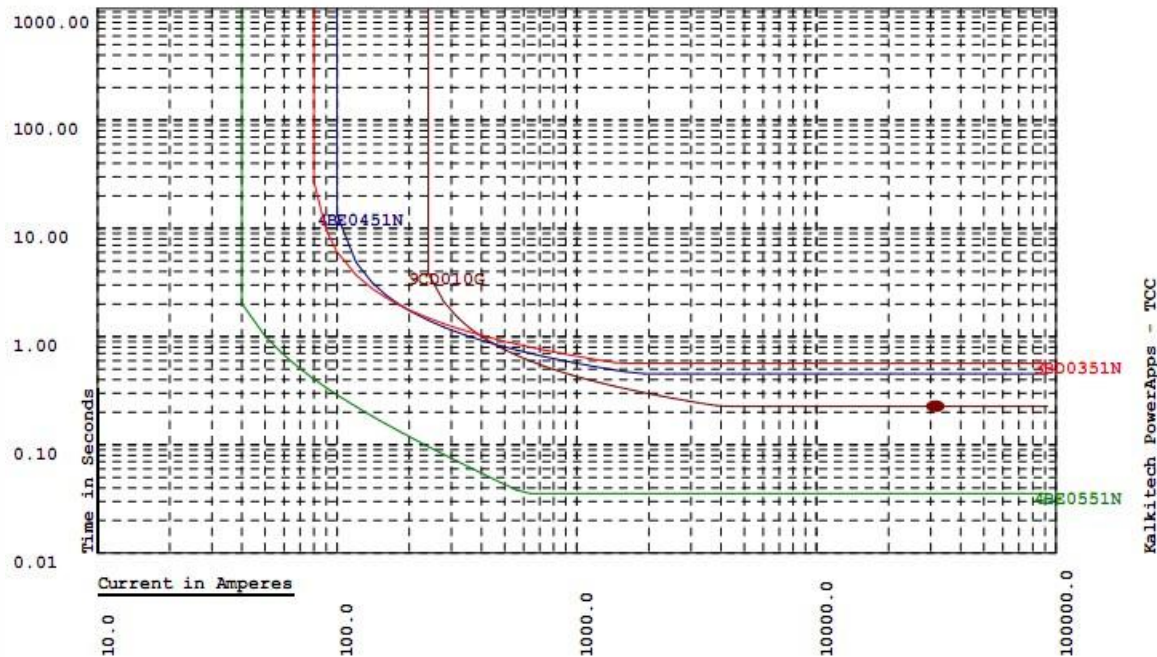


SALFC

- For LFC user needs to enter the system through dialogs.
- Execute tab → Load Frequency Control
- LFC, Area, and Tie Line Parameters are to be entered.
- Click the OK button in the Tie Line dialog to begin SALFC using PowerApps.

TCC Plot

- The plots for relay coordination can be obtained by clicking **TCCPLOT** button in the Plot tab. A sample TCCPLOT is shown below.



HTML Reports

- HTML Reports option is available from Reports tab.
- Wide variety of reports are possible through PowerApps Text Output, On-Screen and HTML Reports (Tabular format).
- PowerApps also provides reports for violations in Transient Stability.



On Screen Reports

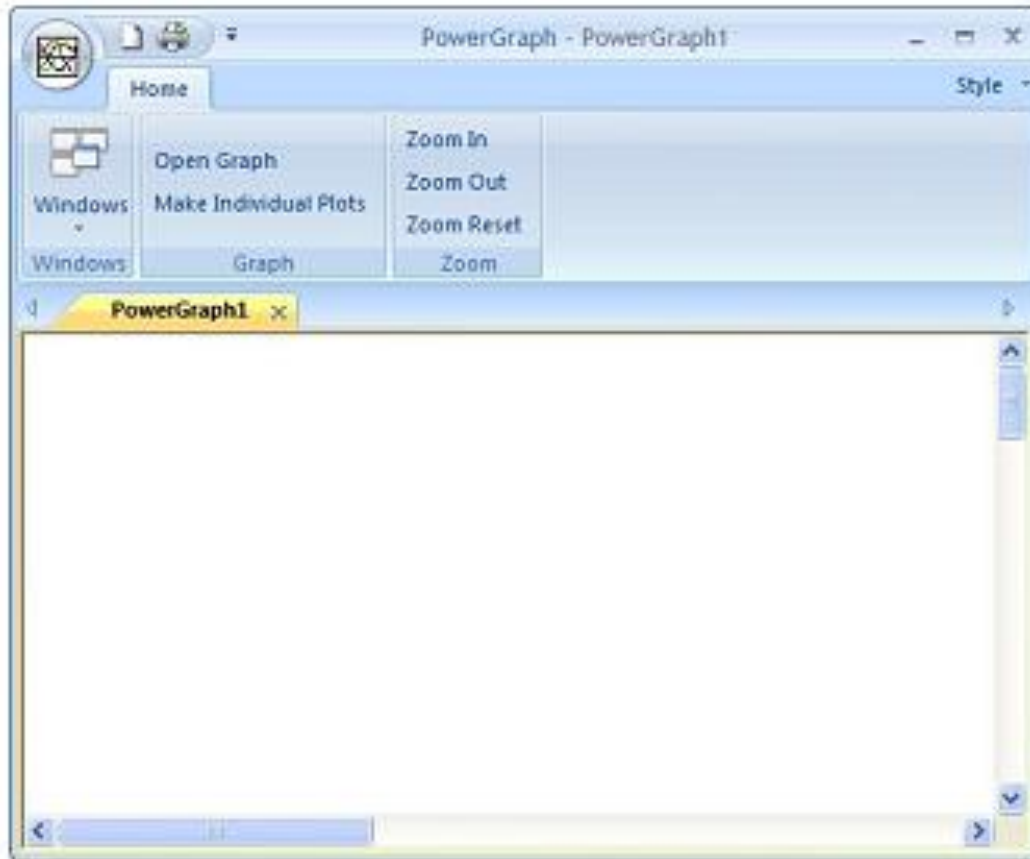
- PowerApps provides menu for all the reports under Reports menu.
- Users needs to click on the type of report to be displayed on the screen.
- The results are also printed out in text file.



PowerGraph

- PowerGraph is a tool to view the plot (*.csv) files generated by PowerApps.
- To view plots user has to Open a New Document and then click on Open Graph button and select a .csv file. PowerGraph plots the graph for all the variables in the file.
- To view individual plots for each variable click on Make Individual Plots button and use Space Bar to navigate through each variable.
- Zoom-In and Zoom-Out options have provided to scale the graphs as user needs them to be.
- Print option is also provided.

PowerGraph Window



Viewing Plots

- To view off-line plots user can visit the Plot tab and then click on either Power Graph Show List or Power Graph Select File button.
- Show List displays a dialog, then user has to select a graph and then click ADD button to display the graph.
- In Select file user has point PowerApps to a '.csv' format file through a file select dialog to display the graph.

PowerGraph Show List

Select Power Graph Input ✖

No. of Graphs ▼

Analysis	Case ID	Bus/Scenario	Variable Type
TSTABILITY	0	DS1	Vt.Gen.PU
TSTABILITY	0	DS1	Turbine.PU.MW
TSTABILITY	0	DS1	T2Flow.MW
TSTABILITY	0	DS1	T2Flow.MVar
TSTABILITY	0	DS1	T2Flow.MVA
TSTABILITY	0	DS1	SVC.PU.Vt
TSTABILITY	0	DS1	SVC.PU.MVar
TSTABILITY	0	DS1	PU.MW
TSTABILITY	0	DS1	PU.MVar
TSTABILITY	0	DS1	PSS.PU
TSTABILITY	0	DS1	LineFlow.MVA
TSTABILITY	0	DS1	Frequency
TSTABILITY	0	DS1	Efd
TSTABILITY	0	DS1	Current
TSTABILITY	0	DS1	Bus.Vt.PU
TSTABILITY	0	DS1	Bus.Freq.Hz
TSTABILITY	0	DS1	ANGLE
TSTABILITY	0	DS1	Acc.Power
TSTABILITY	0	DS1	Absolute Angle

References

- PowerApps User Manual 1.0
- PowerApps Help



THANK YOU

THANK YOU

intelligent energy systems

CONTACT US

Kalki Communication Technologies Limited

#147, 5th Main Road, HSR Layout Sector 7

Bangalore 560102, India

Phone : 91-80-40527900

sales@kalkitech.com

www.kalkitech.com

Kalkitech Inc.

9900 Westpark Dr., Suite 283

Houston TX 77063, USA

Ph: 1-832-922-8910

sales_us@kalkitech.com

Kalkitech FZE

Hamariyah Free Trade Zone

Sharjah, UAE

Ph: 971-50-4832-890

sales_me@kalkitech.com