Presentation Layout

- Introduction to ETAP
- Important features of ETAP
  - Load flow study
  - Short circuit analysis
- How to start ETAP
- How to use the libraries and toolbars
- Practical load flow study example

Introduction to ETAP

- ETAP stands for ElectricalTransient Analyzer Program.
- It is one of the advanced software used for power system.
- It is very user friendly and requires very less simulation time.
- It provides data exchange interfaces including MSWord,MS Excel and PDF etc.

Important Features of ETAP

- Single line diagram can created very easily.
- Infinite number of buses can be added in single line diagram of the Grid structure.
- It has the capability to perform various types of analysis given below.
  - Load flow studies
  - Short circuit analysis
  - Harmonic analysis
  - Optimal power flow analysis
  - Reliability assessment
  - Star analysis of protection devices
  - Transformer sizing and MVA capacity

Load Flow Analysis

- Load flow study is a numerical analysis of the flow of electric power in an interconnected system.
- For notation of load flow, single line diagrams are usually used with per unit system.
- It focuses on the various aspects of the AC parameters of the such as voltages, voltage angles, real power and reactive power.
- It analyzes the power system in normal steady-state operation.
- Power flow study is very important for future expansions of power system.
- Gauss-Seidel, Newton-Raphson and Fast Decoupled are the various techniques used for load flow studies.

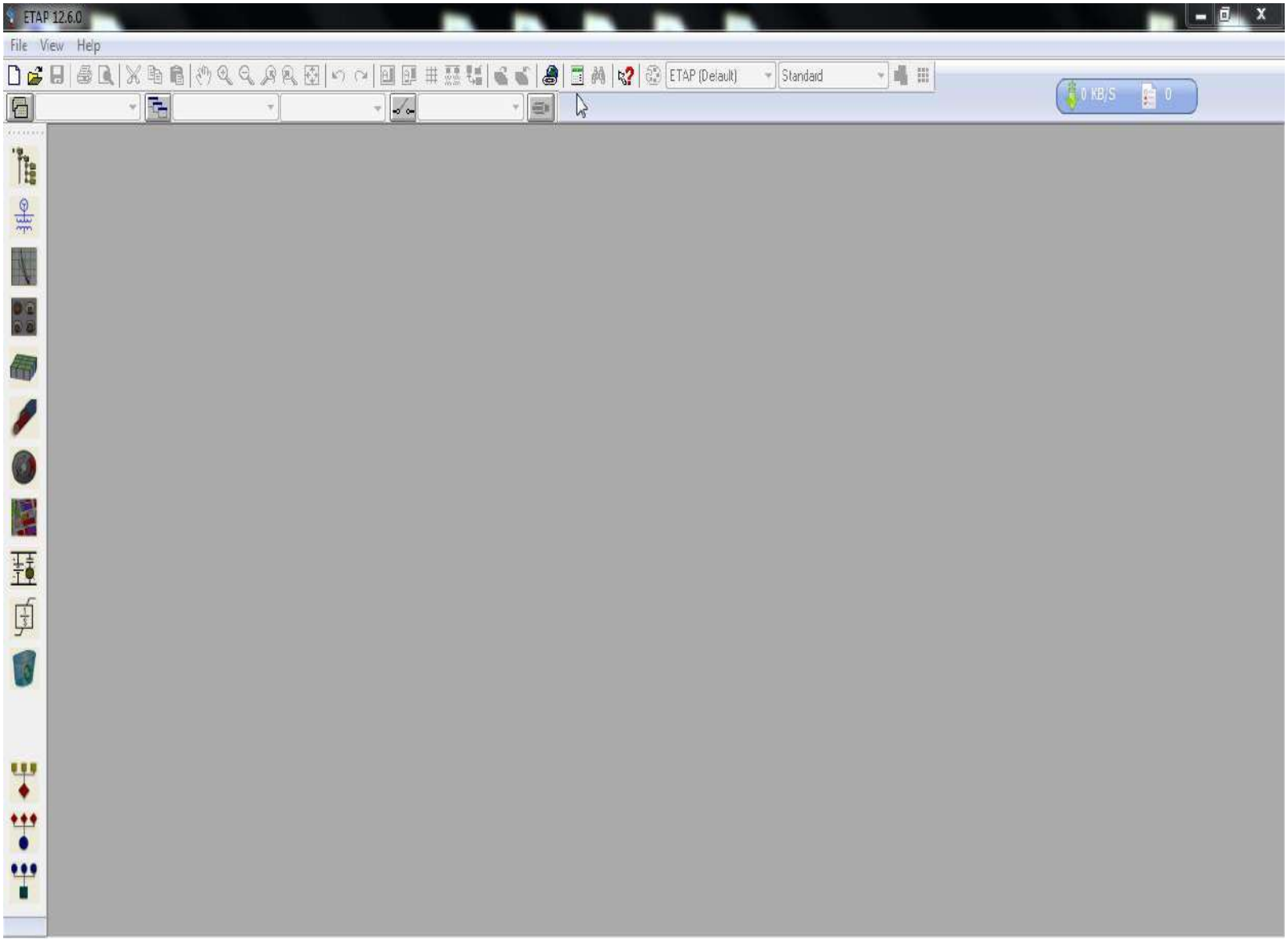
Short Circuit Analysis

- A short circuit is an electrical circuit that allows a current to travel along an unintended path, often where essentially no (or very small) electrical impedance is encountered.
- This high amount of current introduce a large amount of destructive energy in the forms of heat in to the power system.
- The reliability and safety of electric power distribution systems depend on accurate and thorough knowledge of short-circuit fault currents that can be present, and on the ability of protective devices to satisfactorily interrupt these currents.
- A Short Circuit Analysis will help to ensure that personnel and equipment are protected by establishing proper interrupting ratings of protective devices (circuit breaker and fuses).

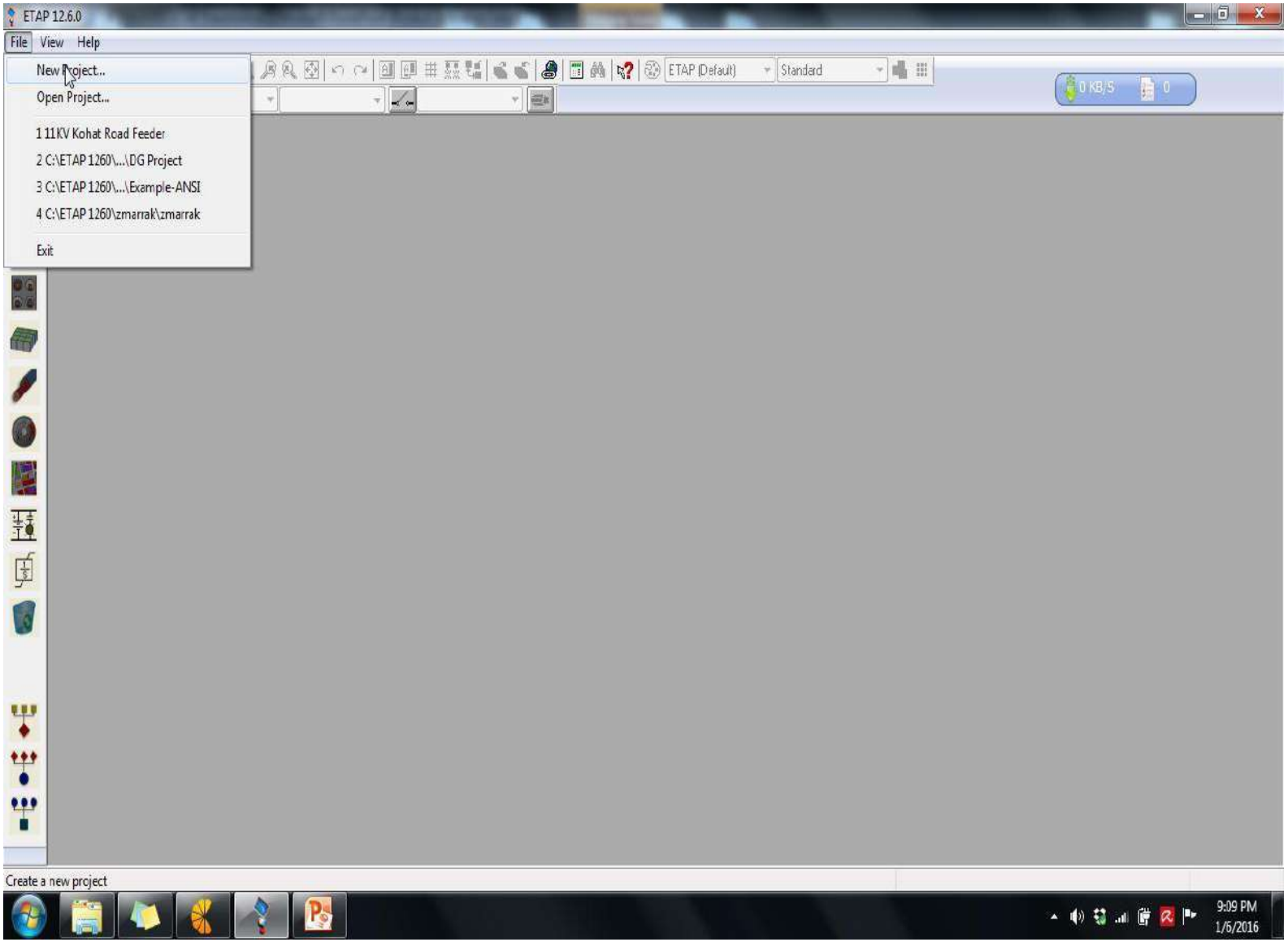
How to Start ETAP

- First install ETAP in your system.
- Click on ETAP shortcut icon available on desktop after installation.

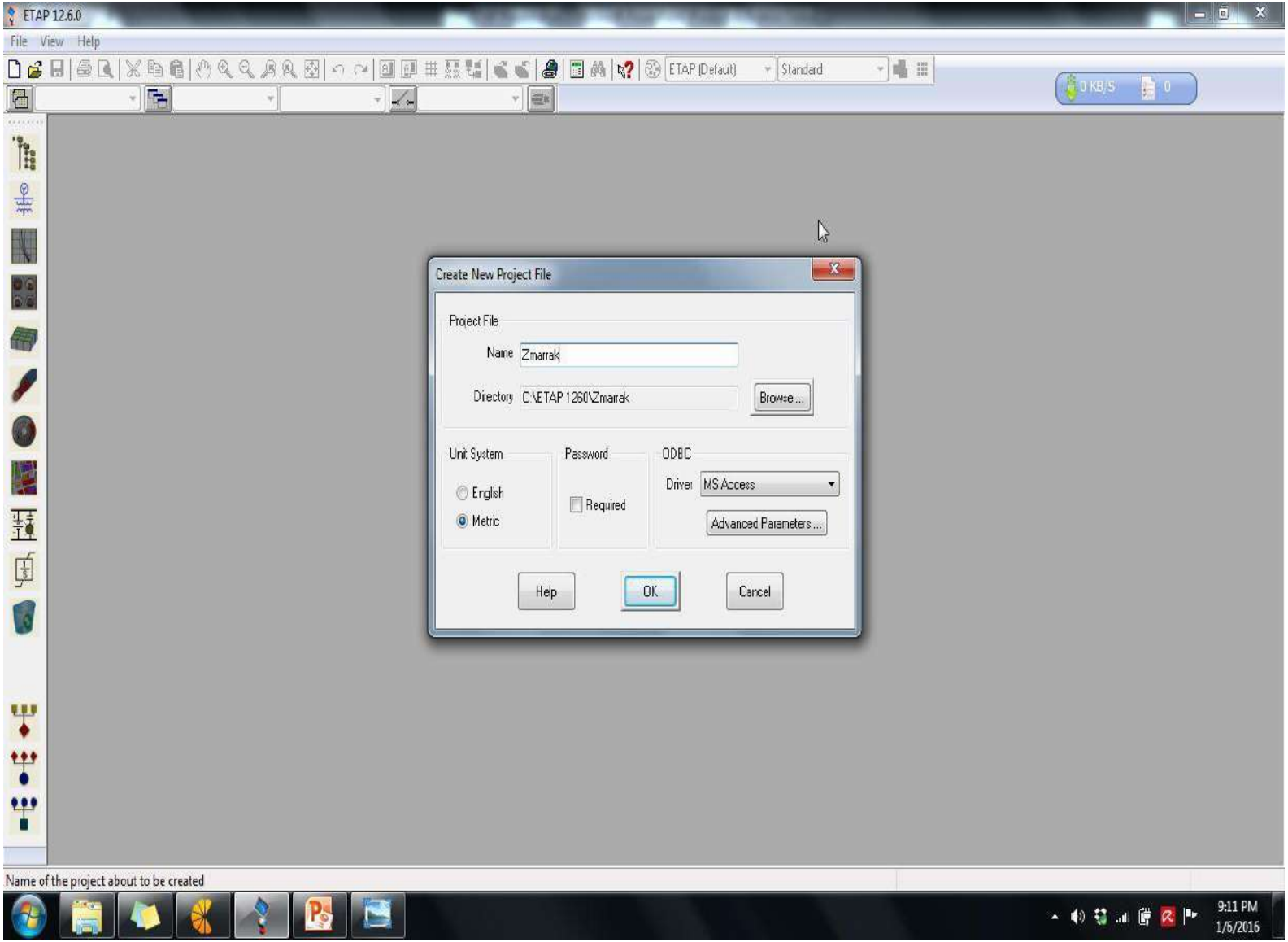
Main Window of ETAP



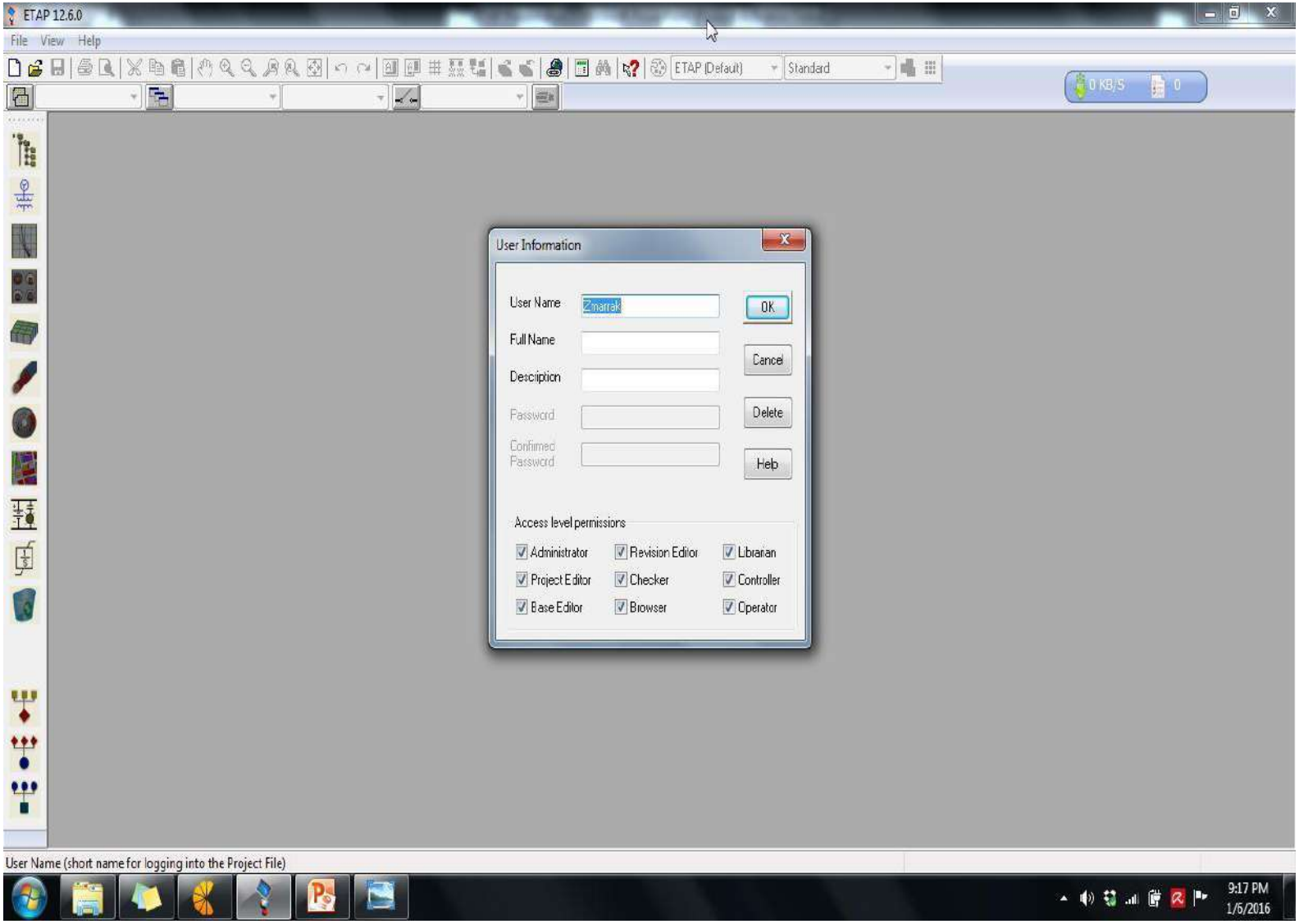
How to Open New Project



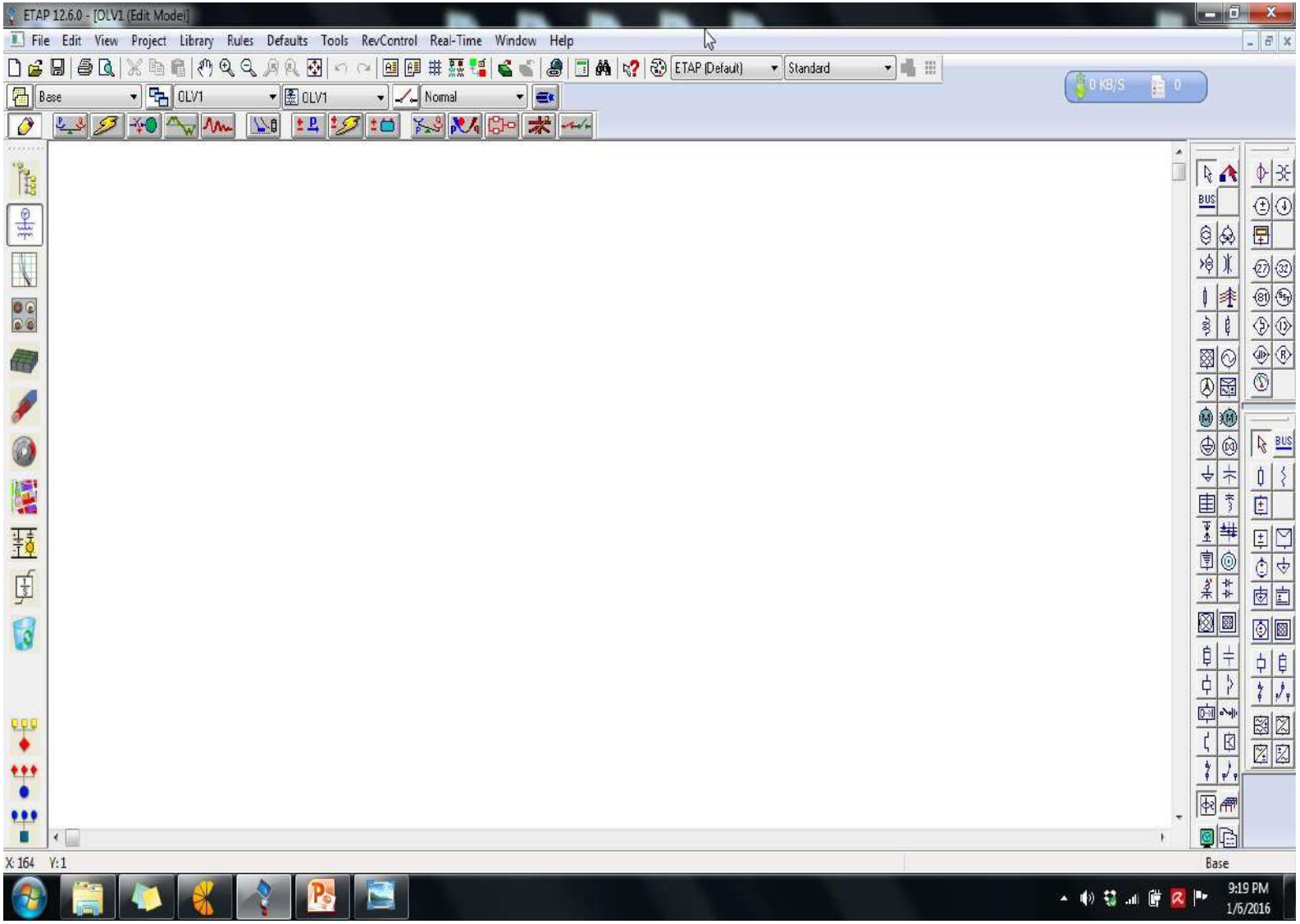
Enter Project File Name and Unit System



Enter Full Name and Description



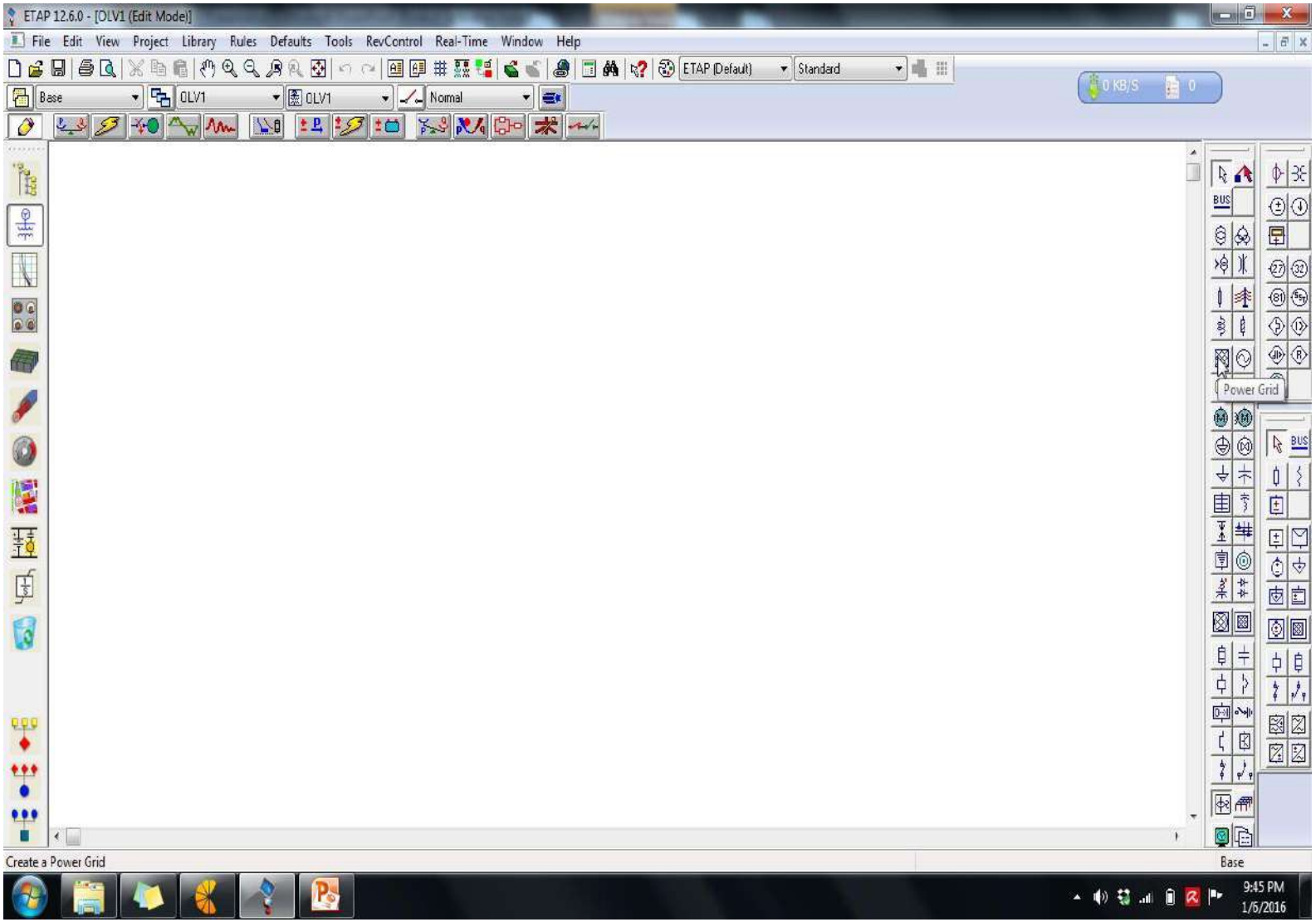
Main Window for Project



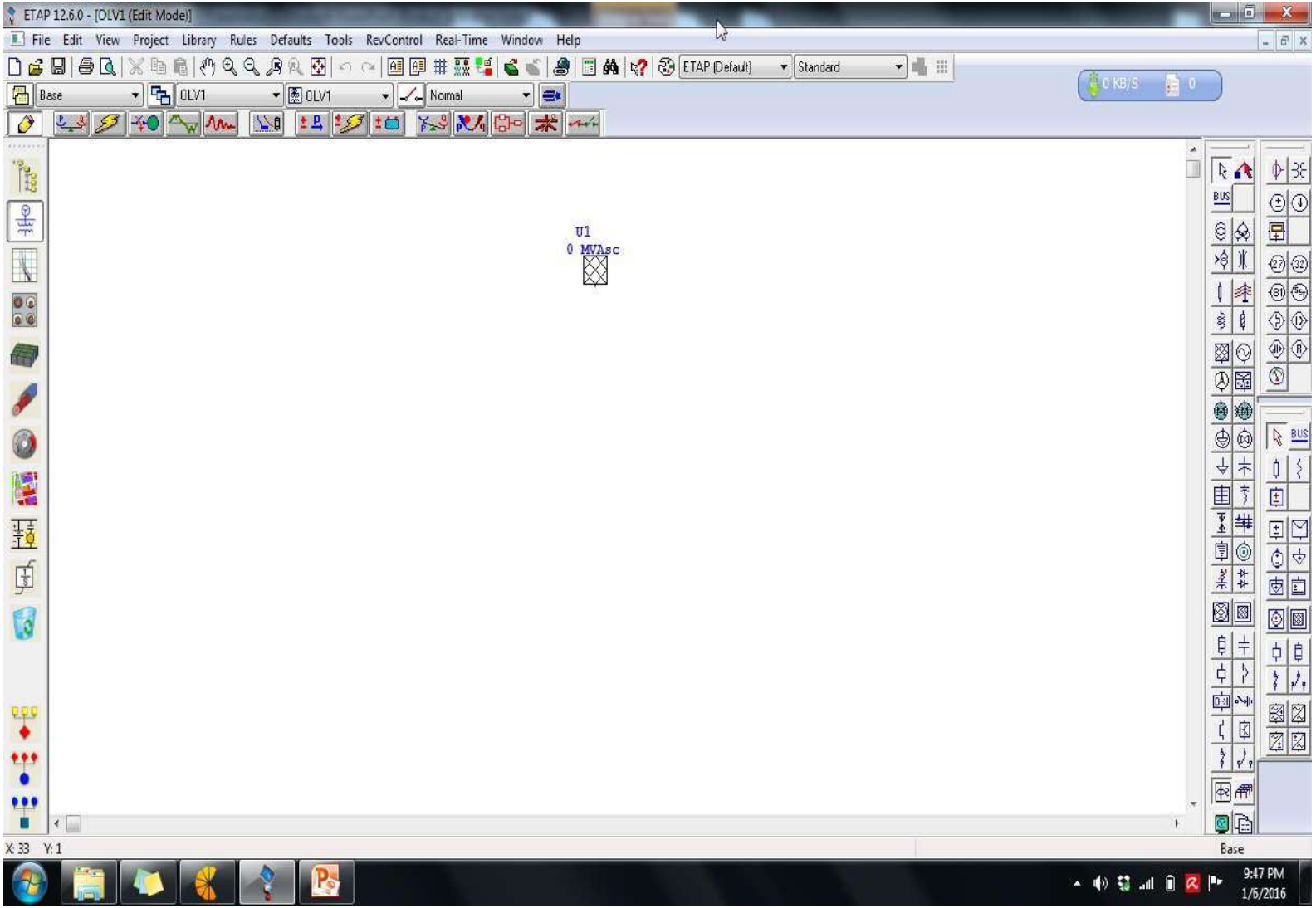
Different Toolbars

- On the main page we have different toolbars such as
  - Project toolbar
  - System toolbar
  - Mode toolbar
  - Presentation toolbar
  - Real toolbar

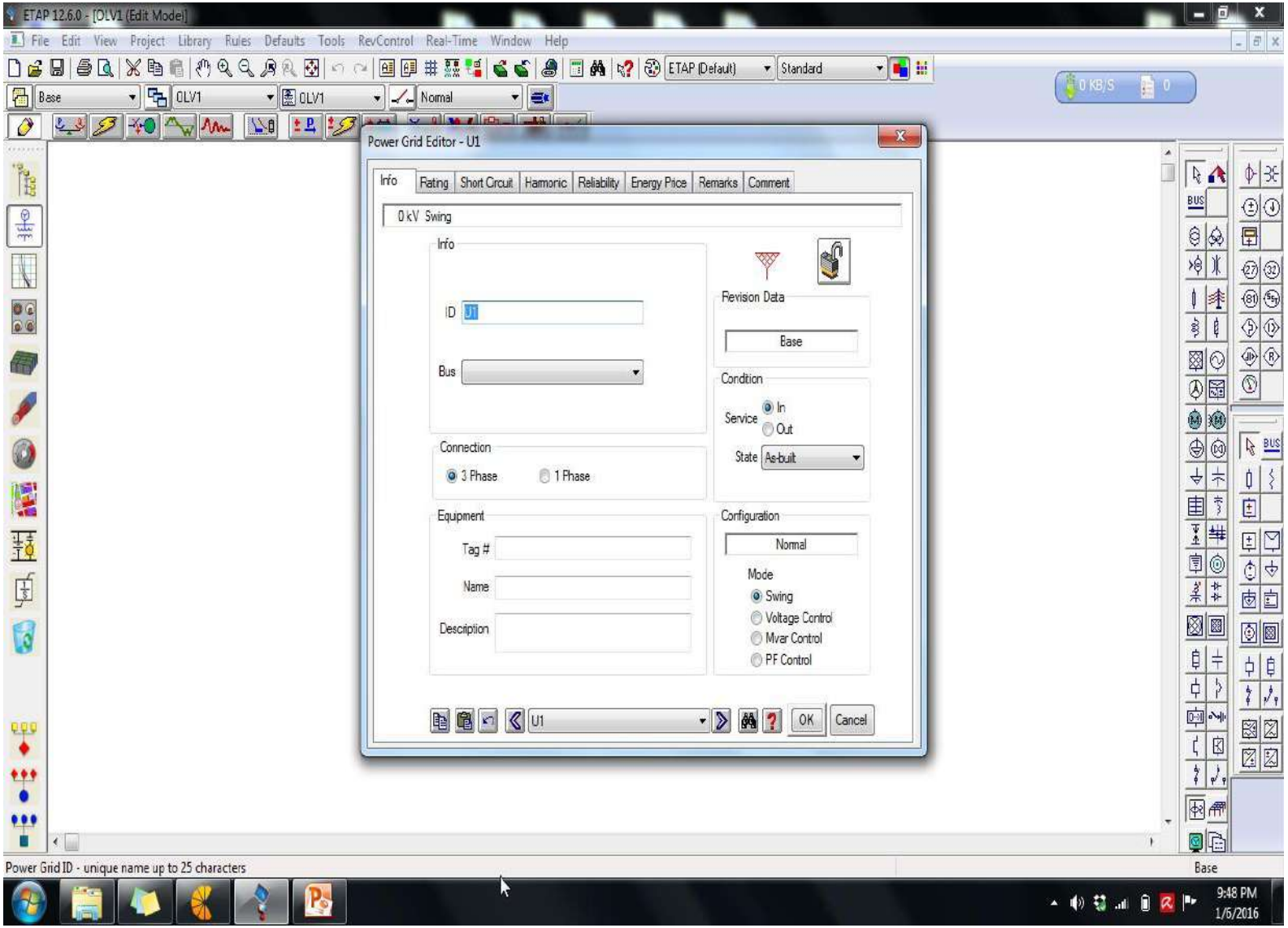
Start of Project from Power Grid



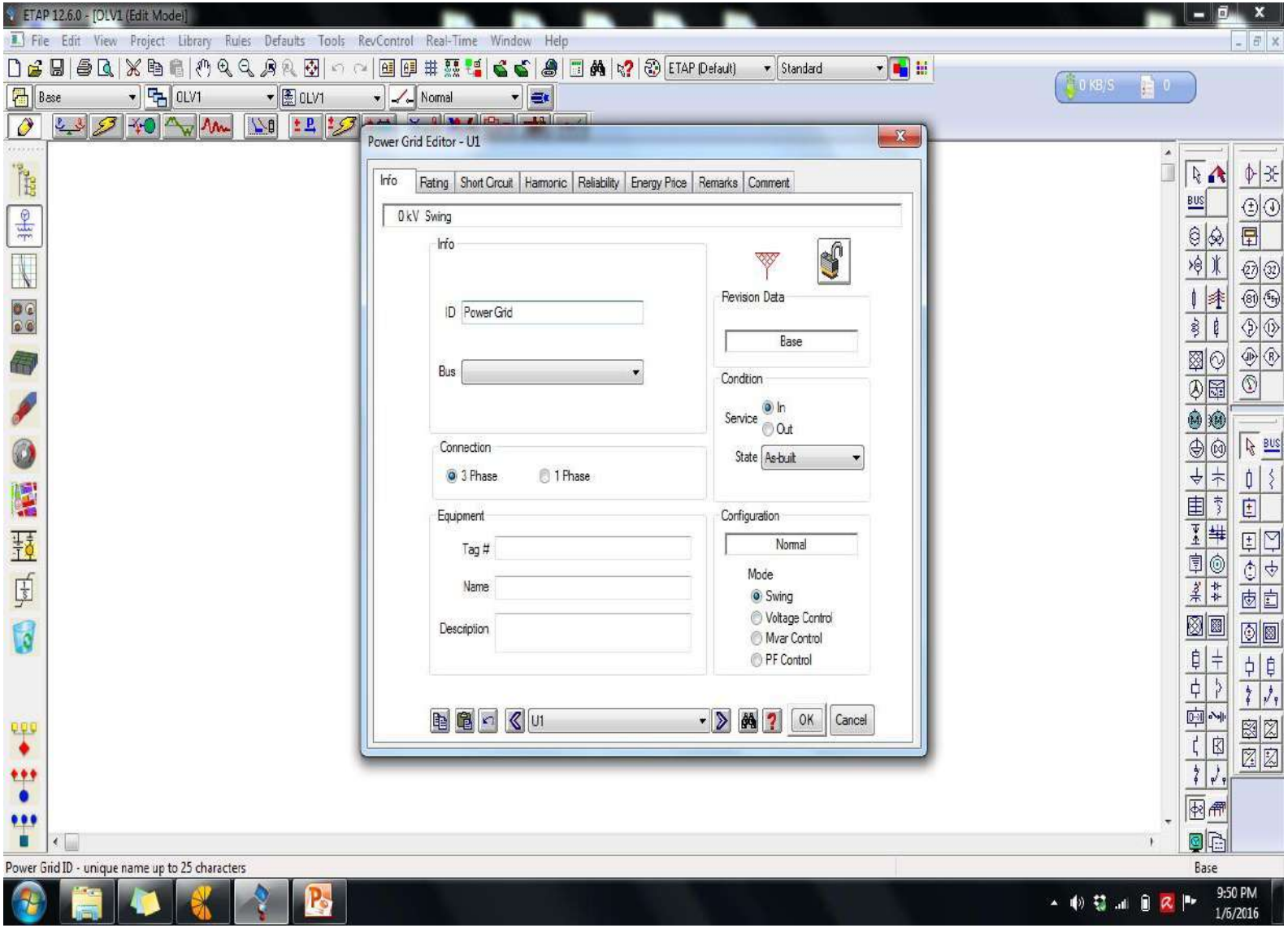
Select Power Grid and Bring it to Main Window



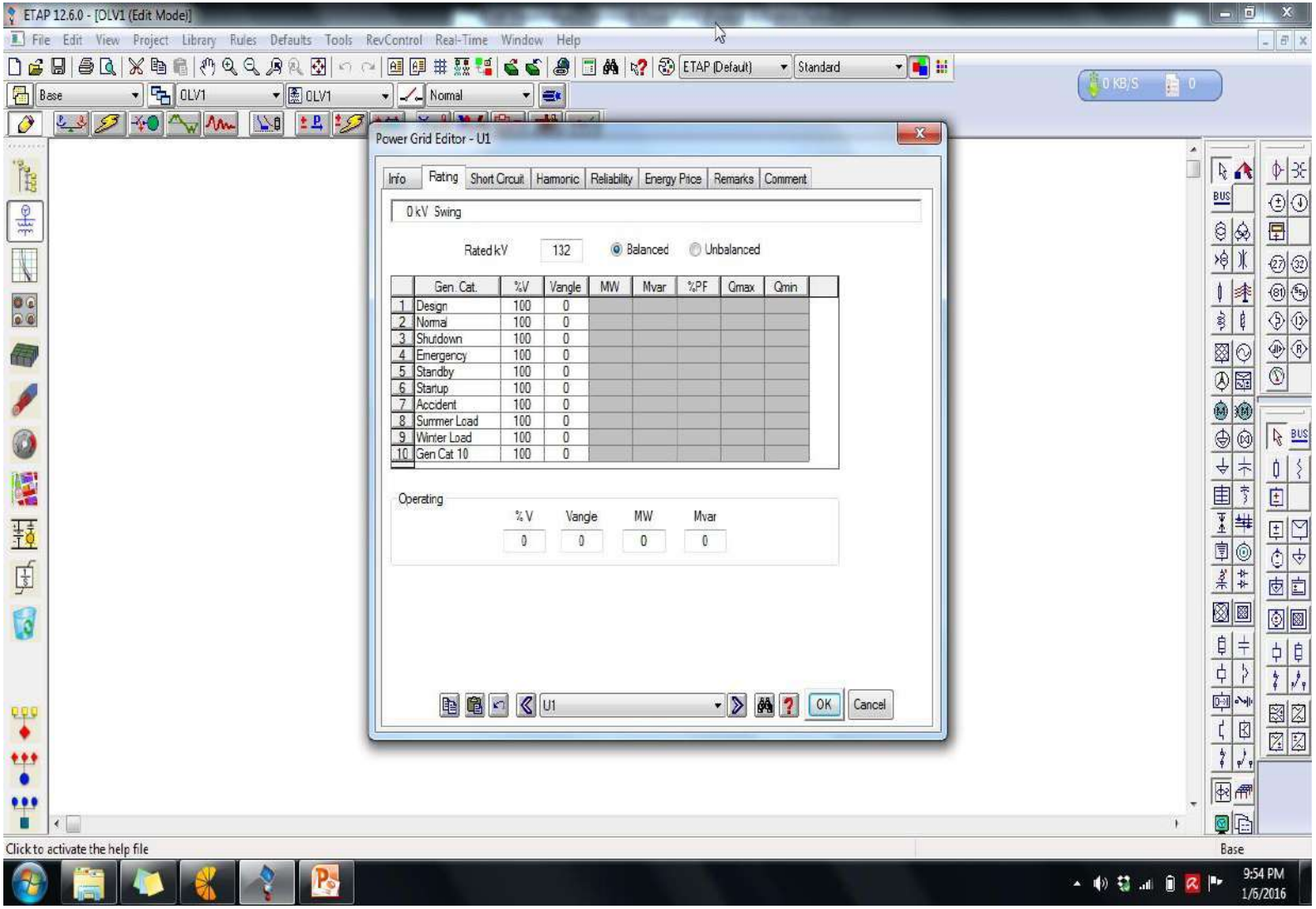
Open Power Grid



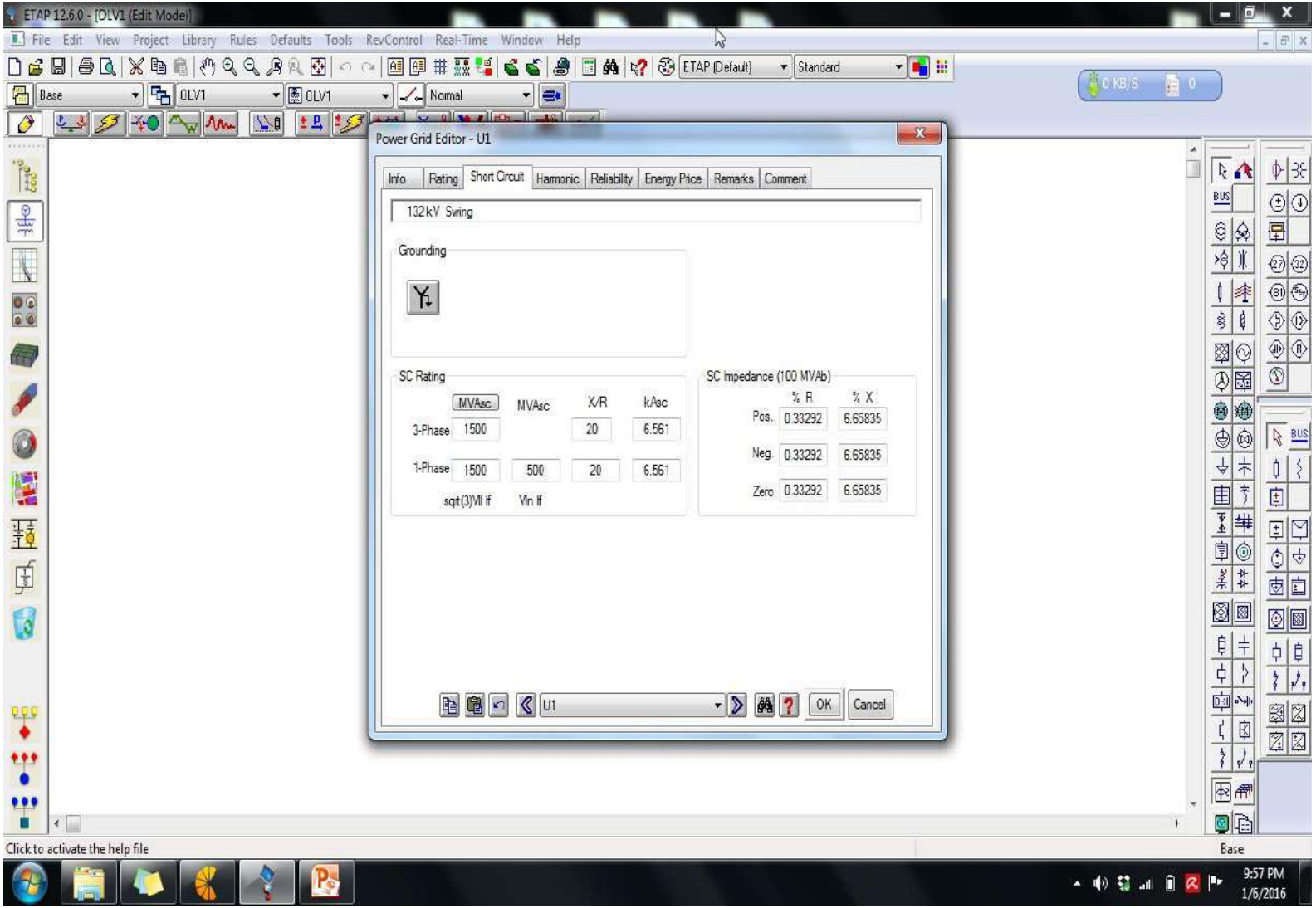
Provide Information about Power Grid



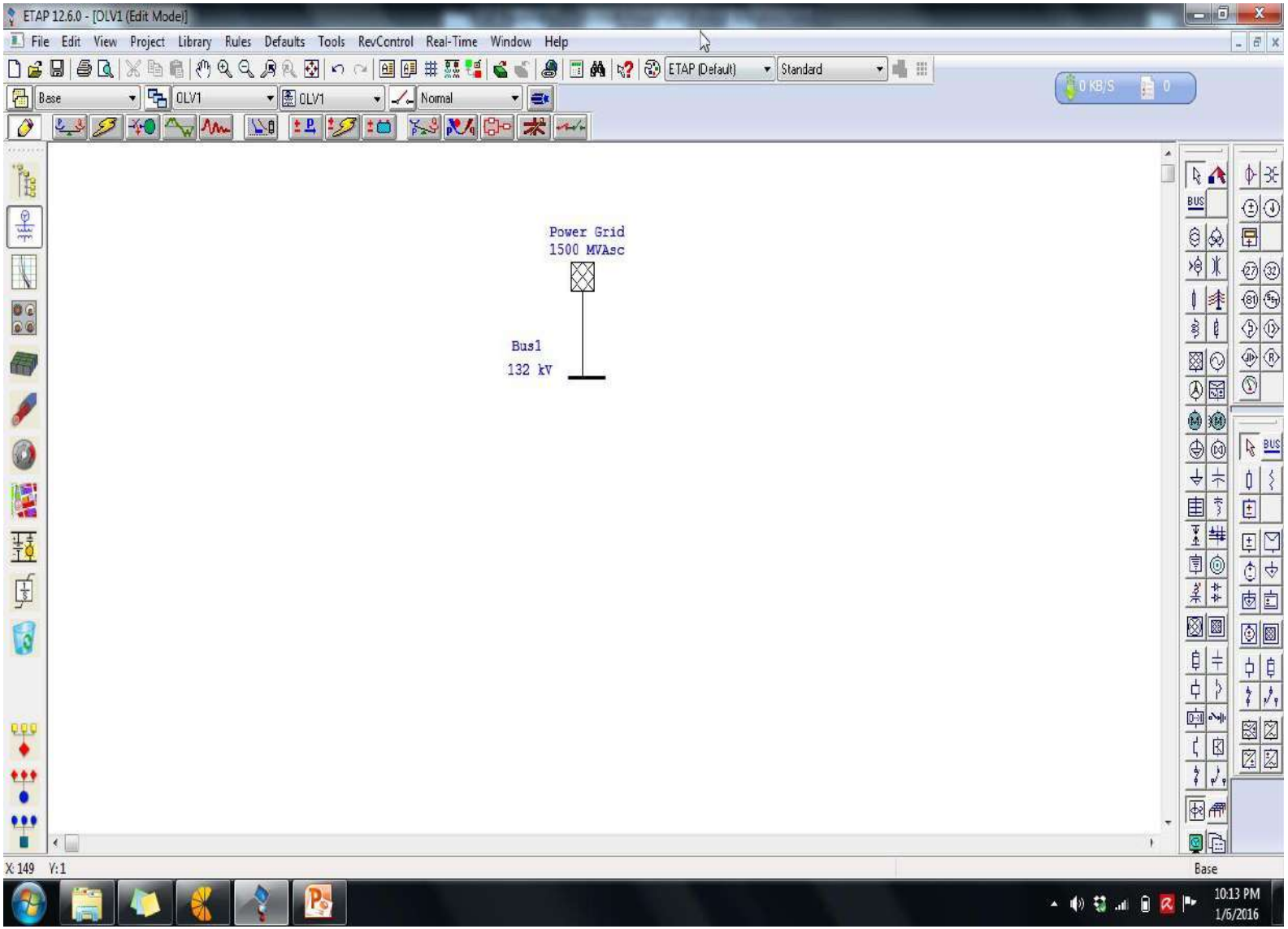
Provide Ratings (Voltage Level)



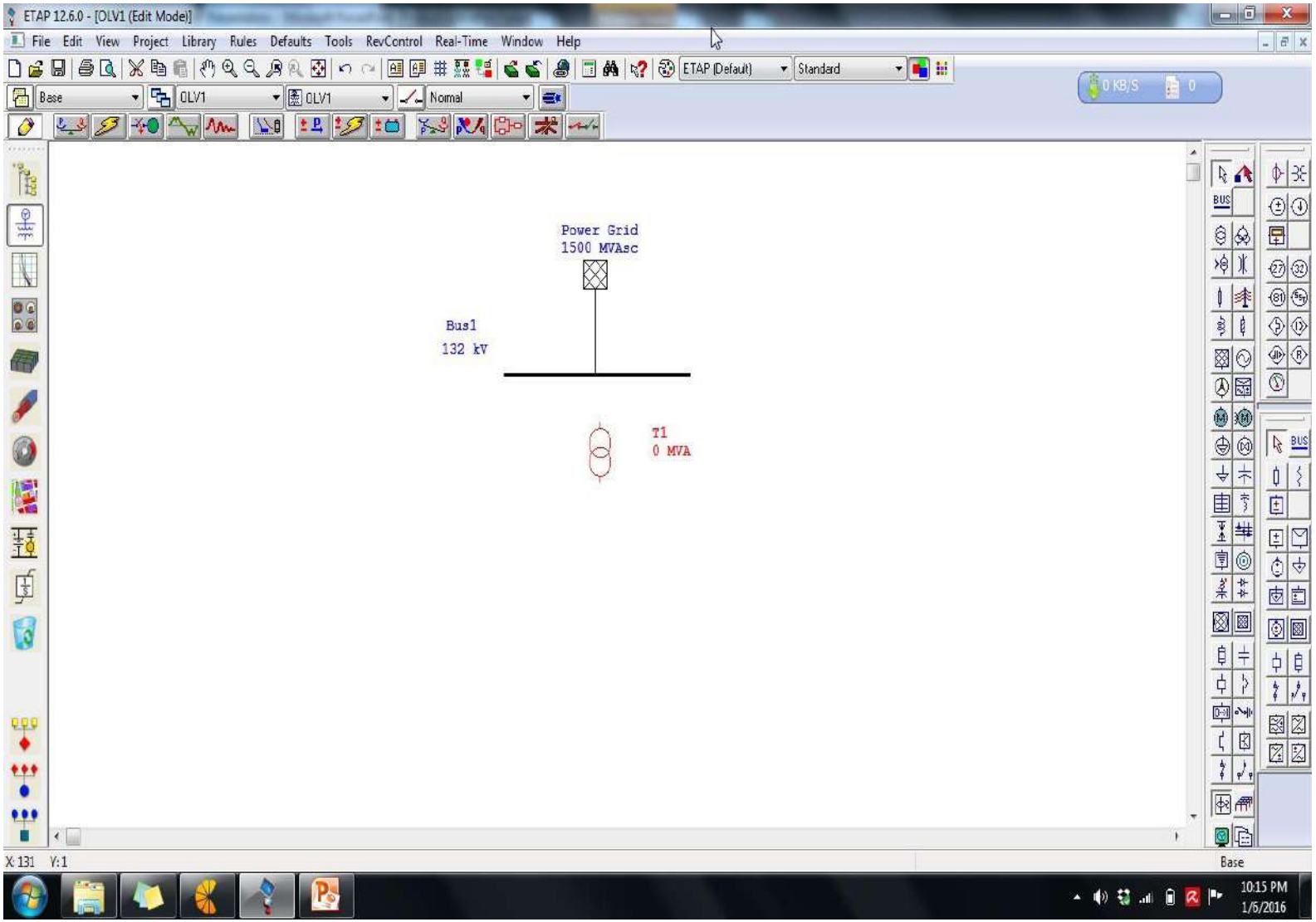
Provide Short Circuit MVA and X/R (Imp)



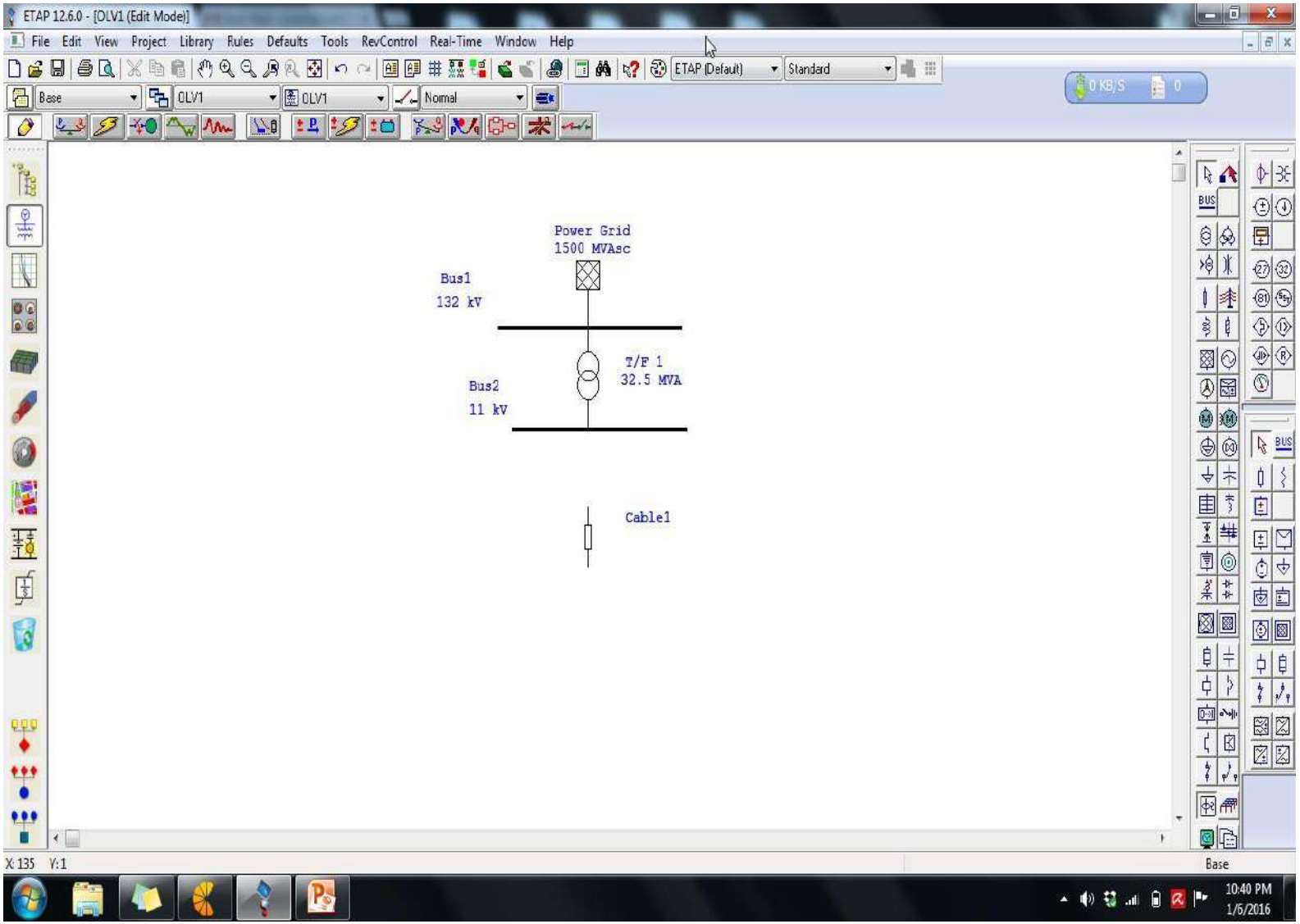
Power Grid Connected with Grid



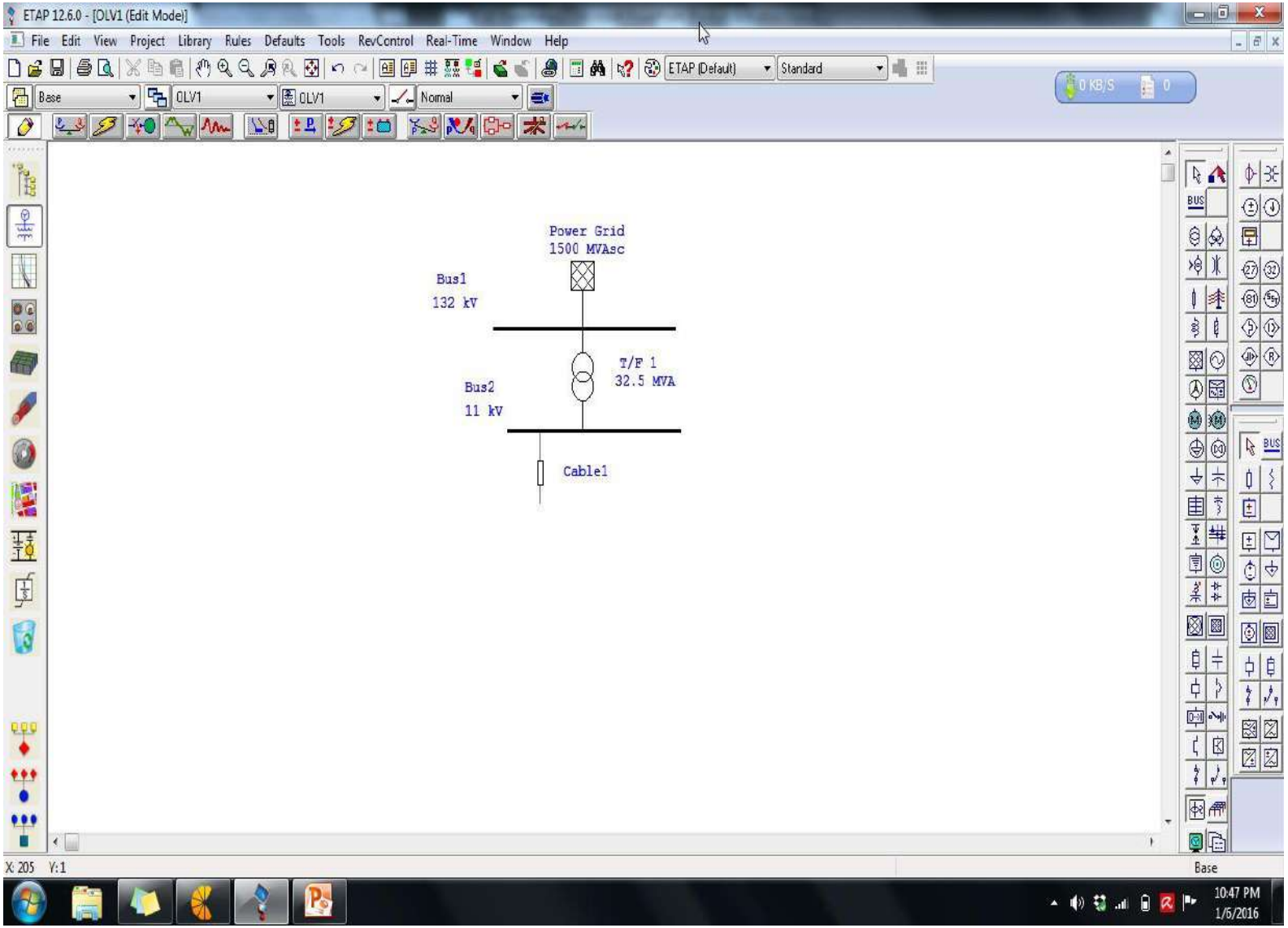
Select Two Winding Transformer and Drag it to Main Window



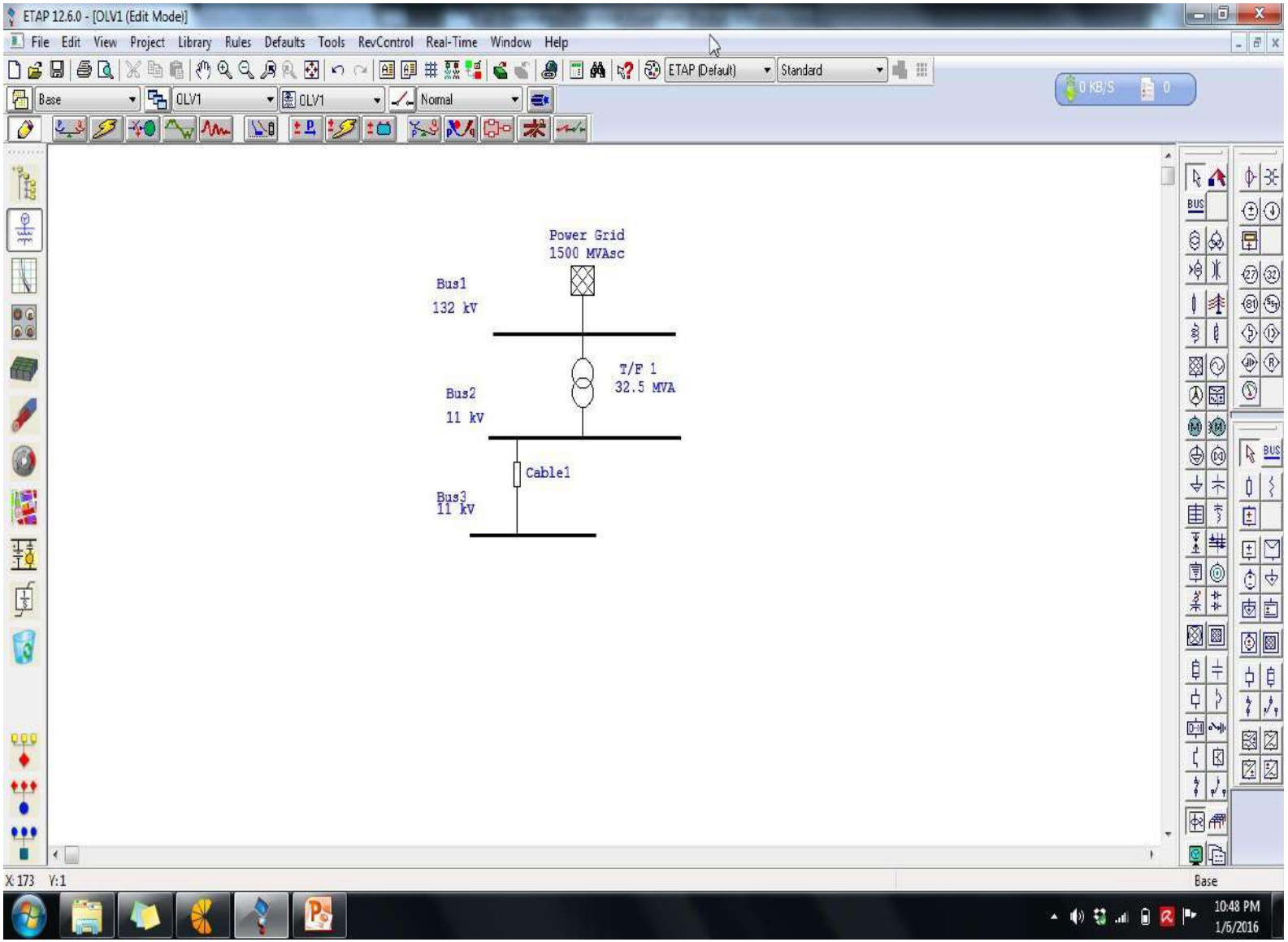
Drag Cable to Main Window



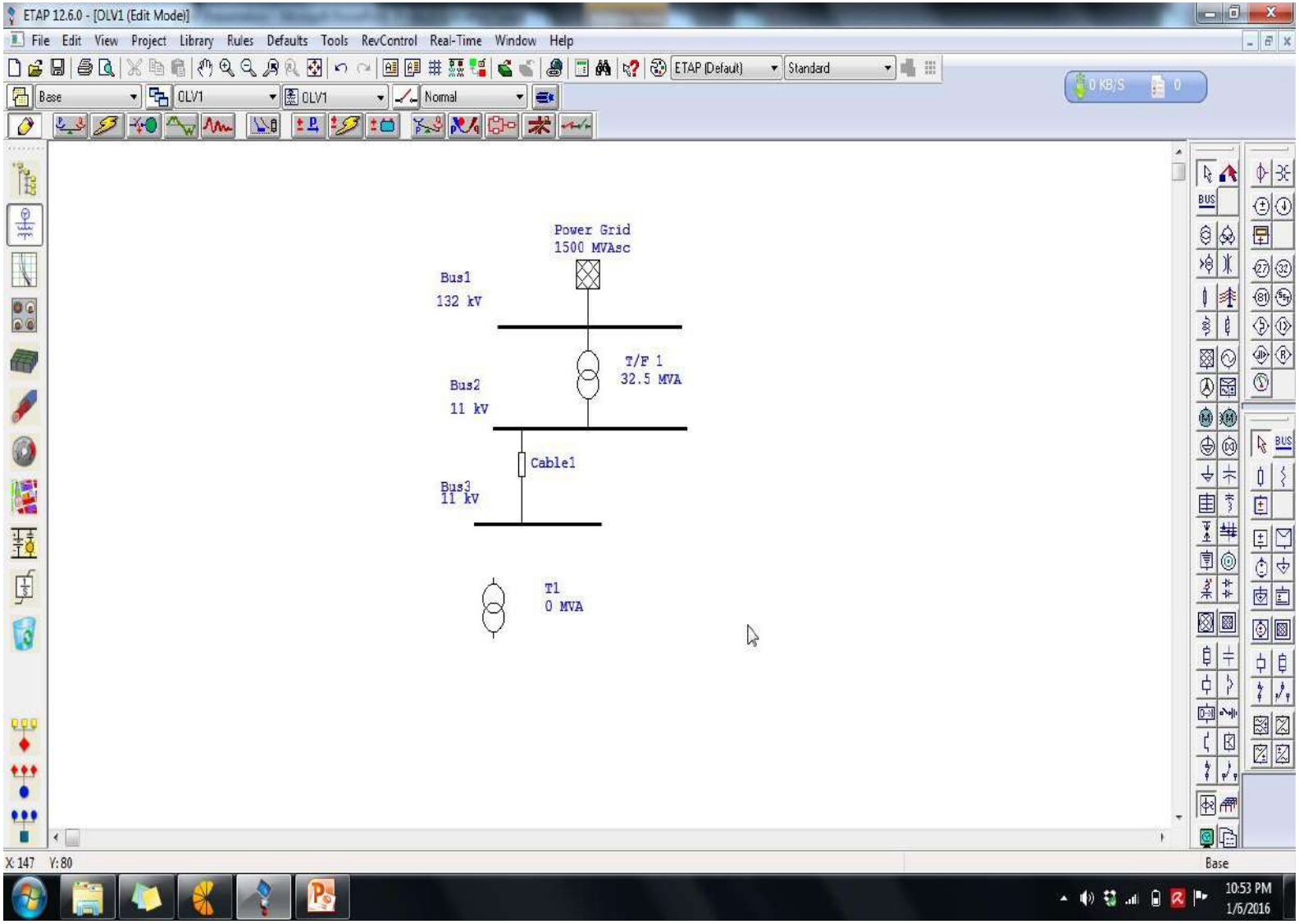
Cable Connected With Busbar



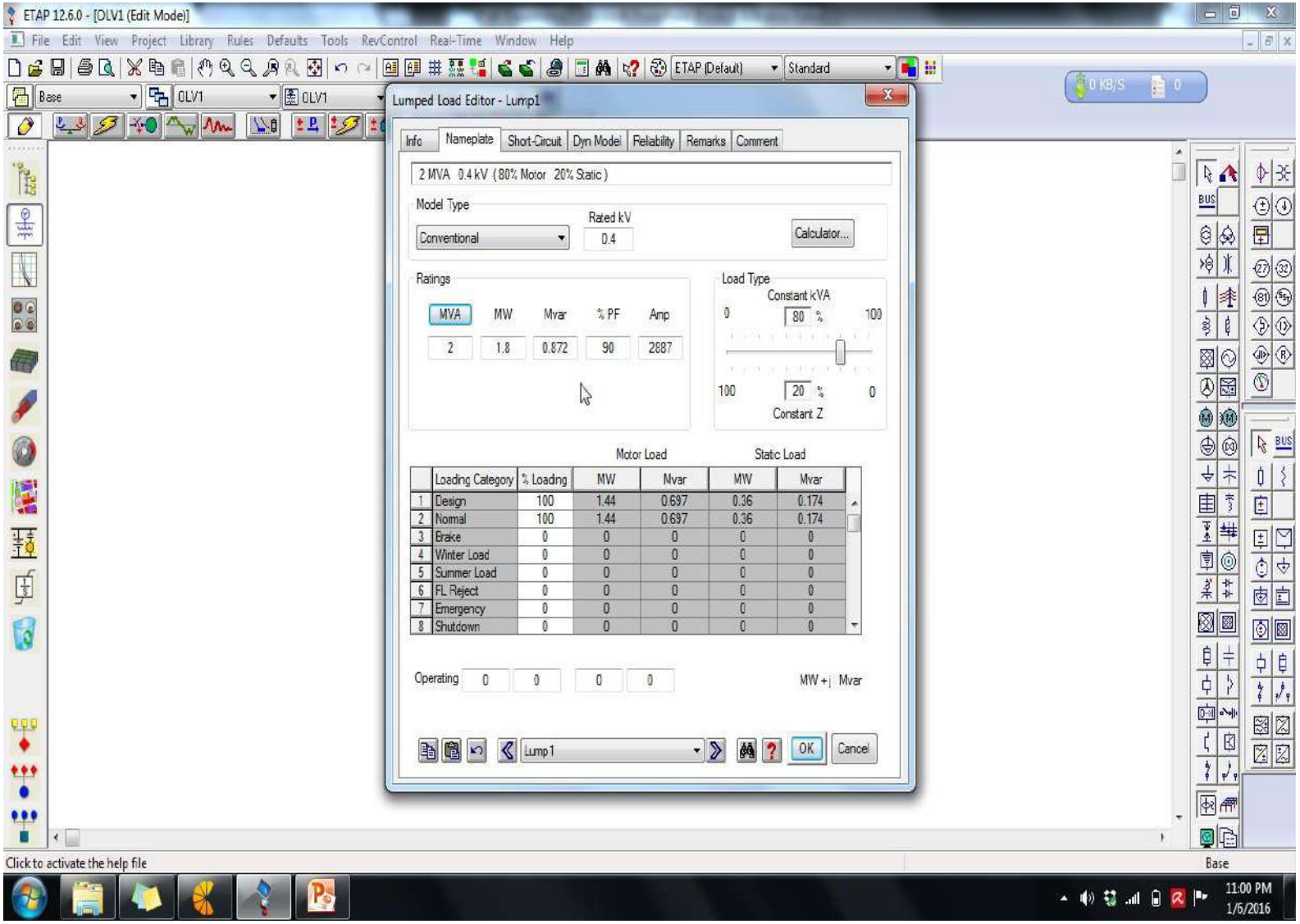
Cable is Extended to Load Point



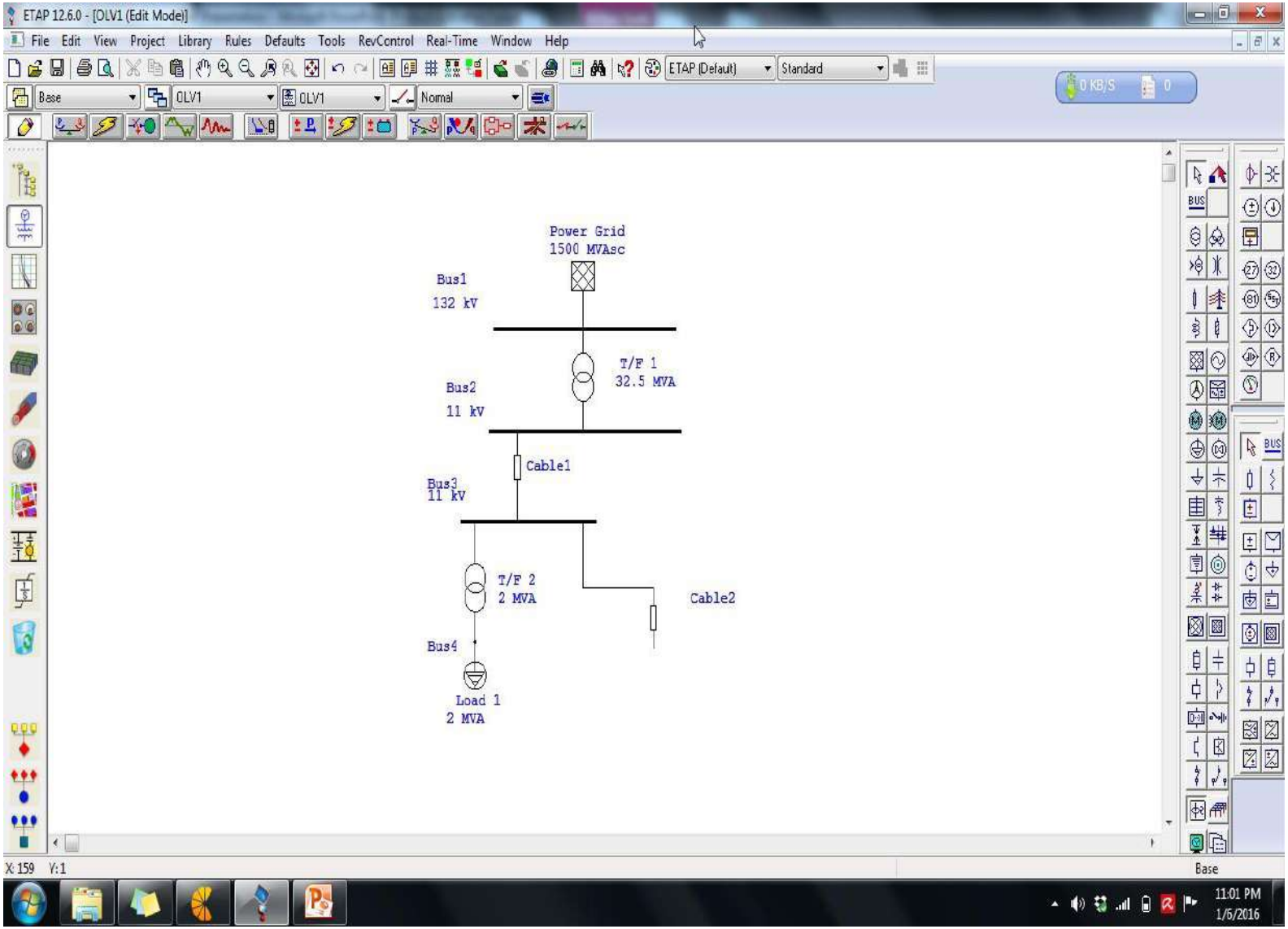
Select T/F and Drag to Window



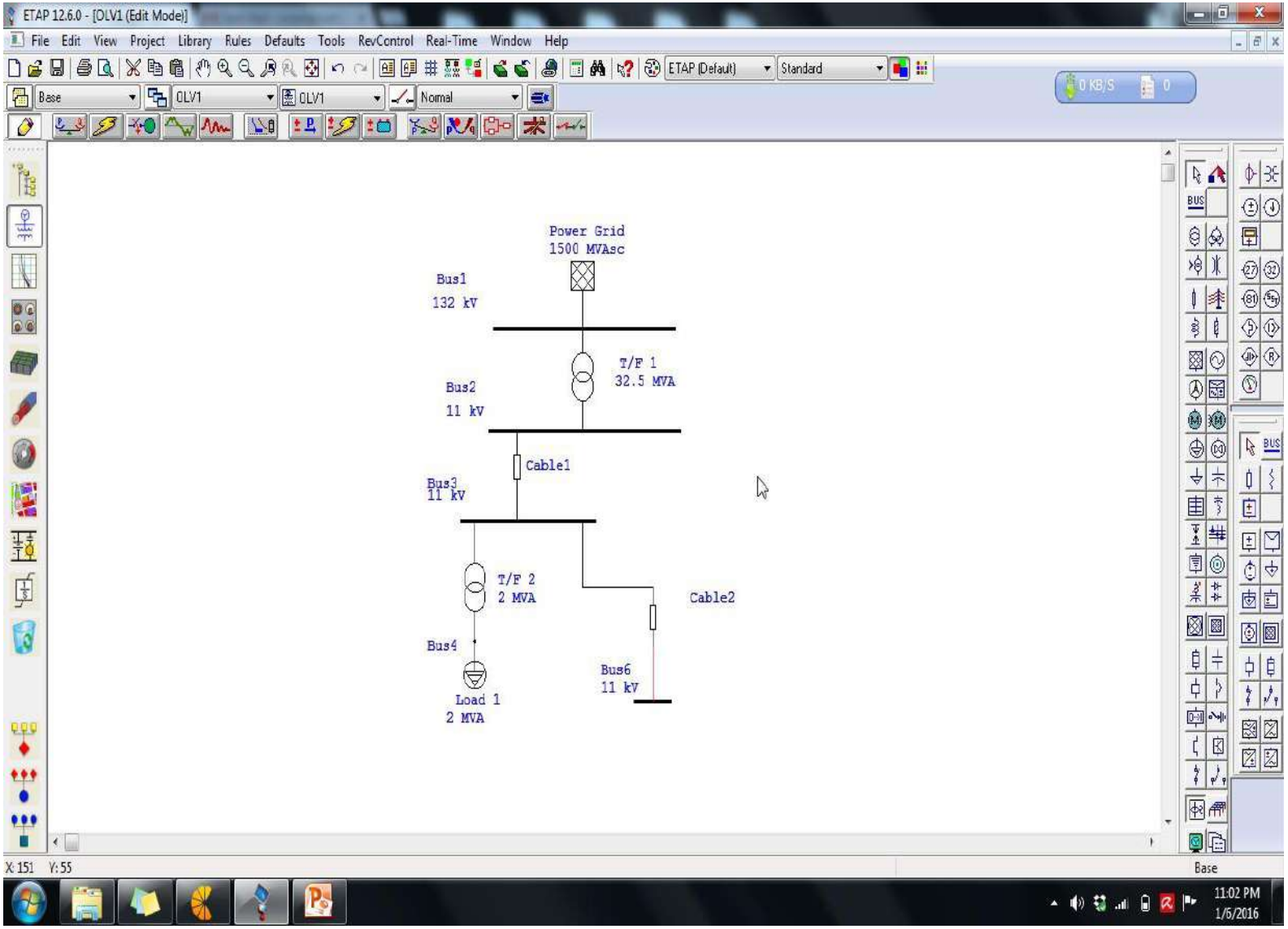
Edit Ratings of Lumped Load



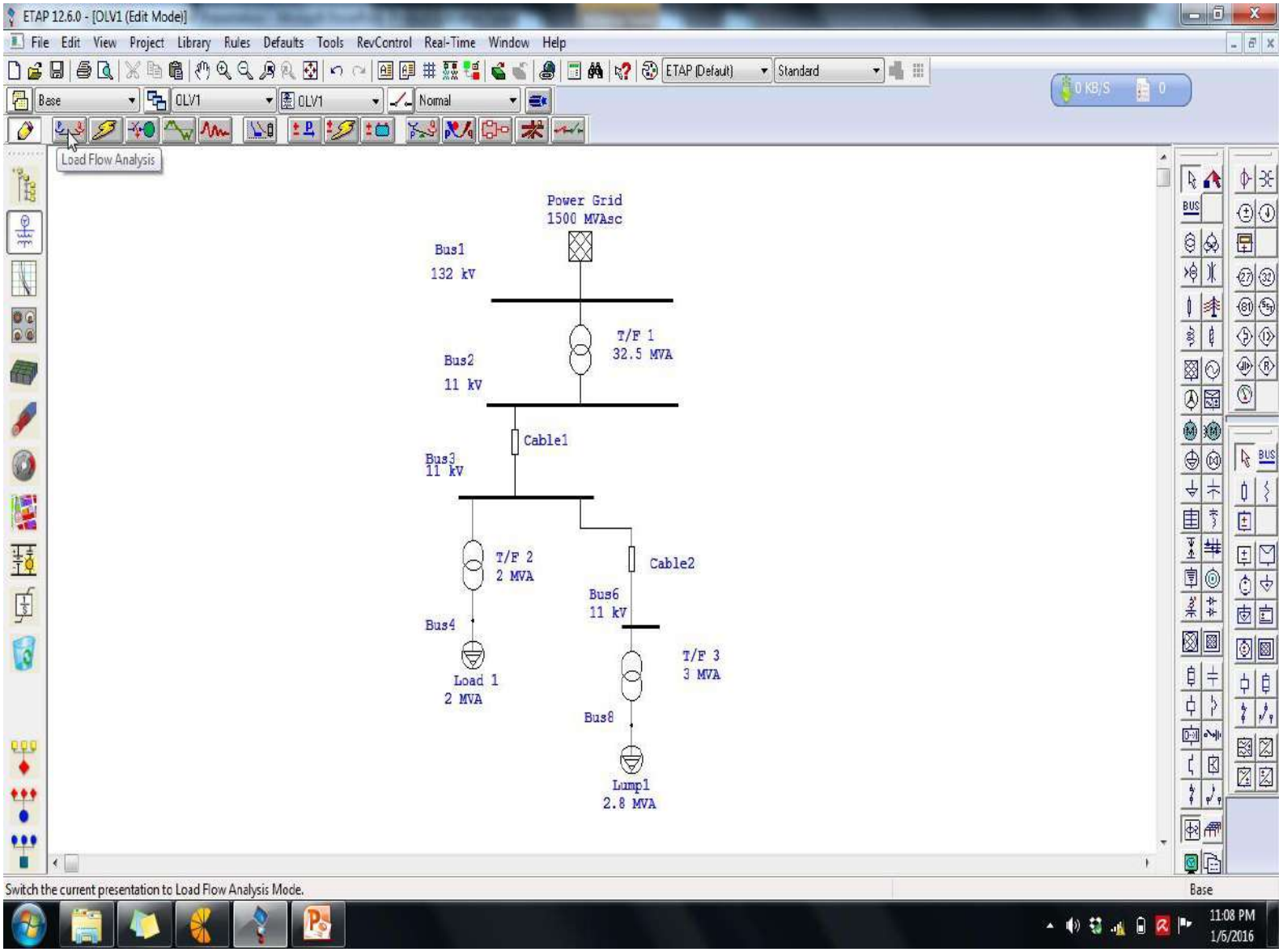
Connect Cable and Energize It



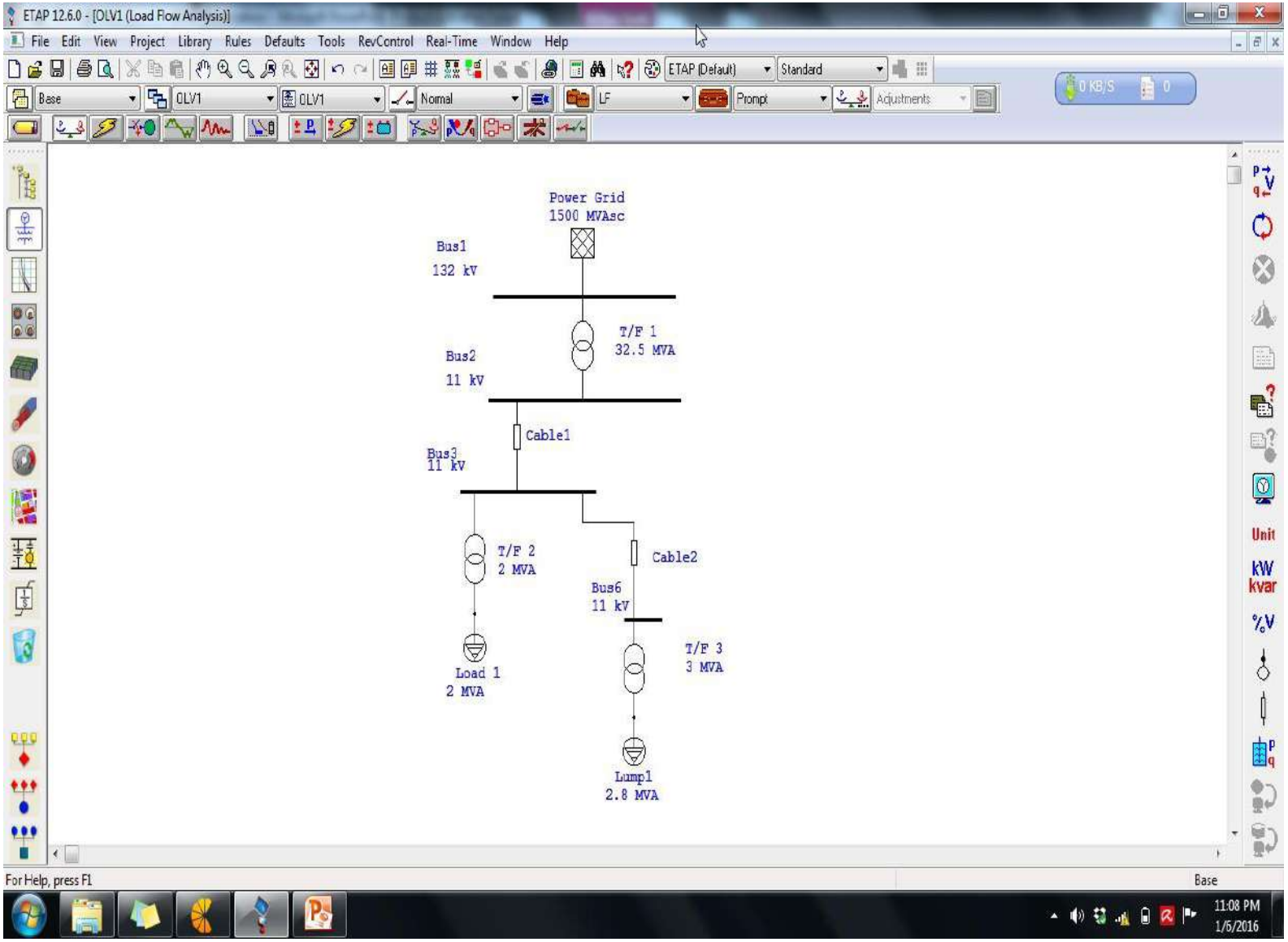
Insert Busbar and Connect Cable to Energize it



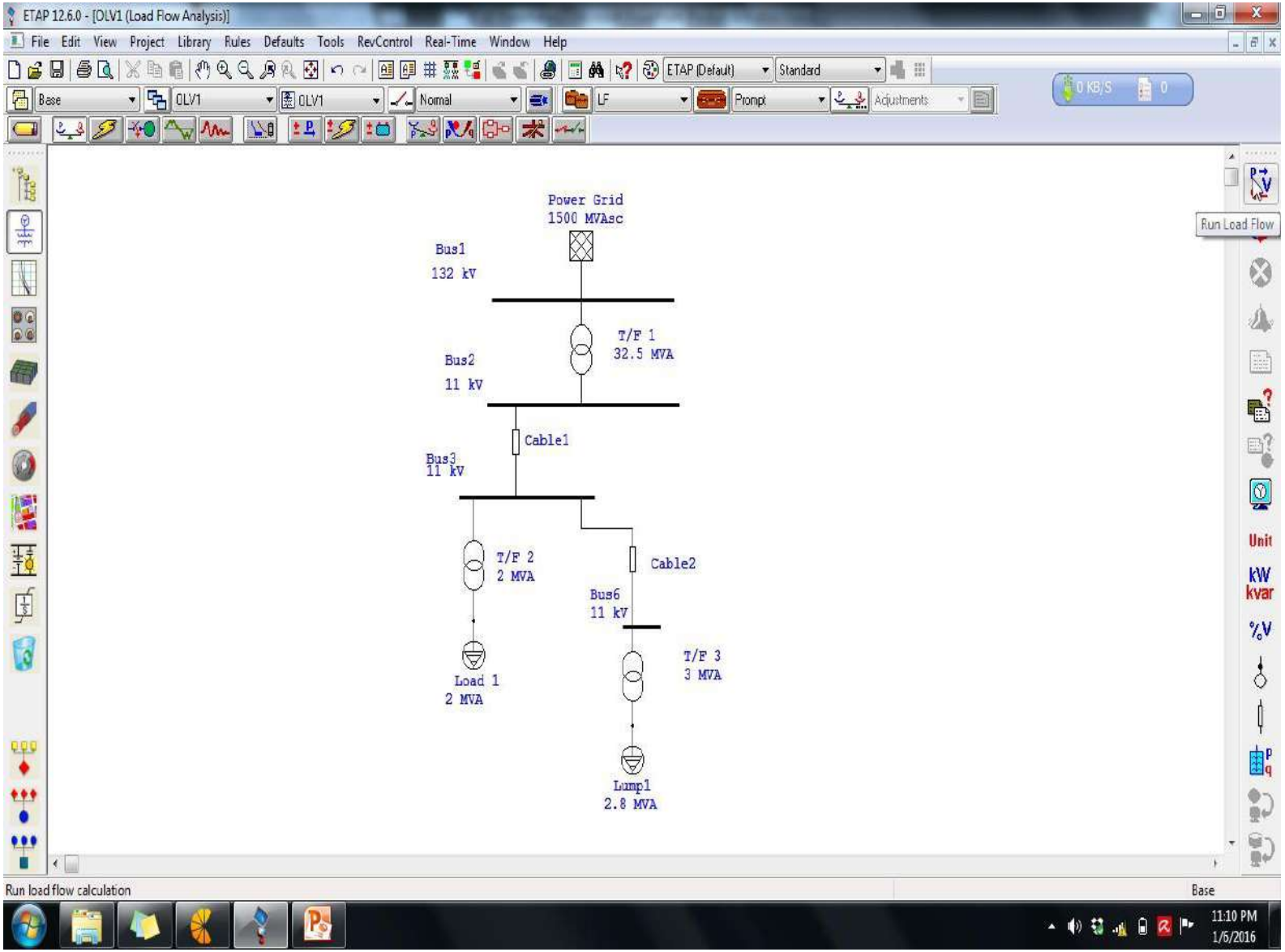
How to Perform Load Flow Study



Select Load Flow Analysis



Select Load Flow Analysis



Simulation of Load Flow