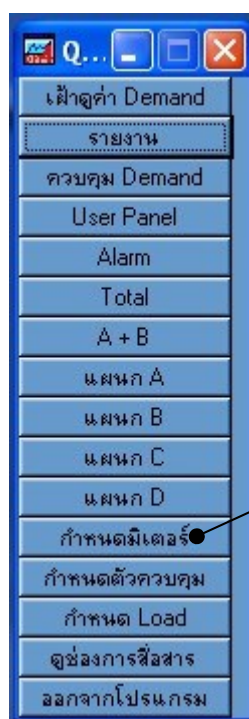


Application Power Monitor PRO

1. How to Connect to a Computer

1.1 Press the button to set the meter figure 1



Press the button to set the meter

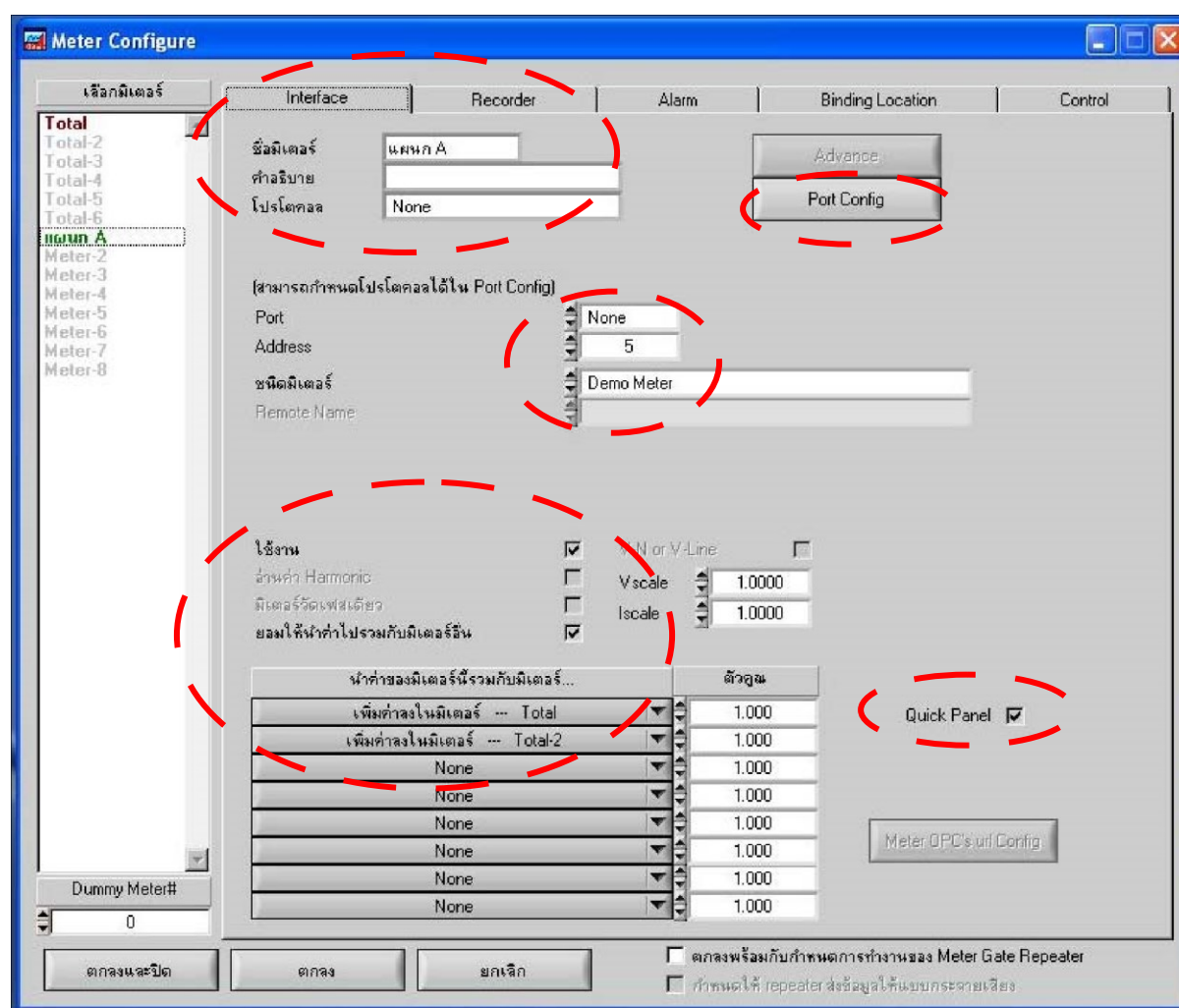
Picture 1 _____

1.2 Press Tab Bar Interface figure 2 .

1.3 Type a name meter into the name field meter.

1.4 Click select port to port figure 2.

1.5 Enter the address that matches the address of the Power meter needs to be connected figure 2.



Picture2 Set the meter display window

1.7 select COM Port (how we see what the USB port on the computer Right click on My Computer /Properties / Click select Tab Hardware / Device Manager / double click Ports (COM & LPT) see the USB Serial Port would say that what we now connect with computer figure 3

1.8 Select Baud Rate as 9600 figure 3

1.9 Select Data bits as 8 figure 3

1.10 Select Parity as None figure 3

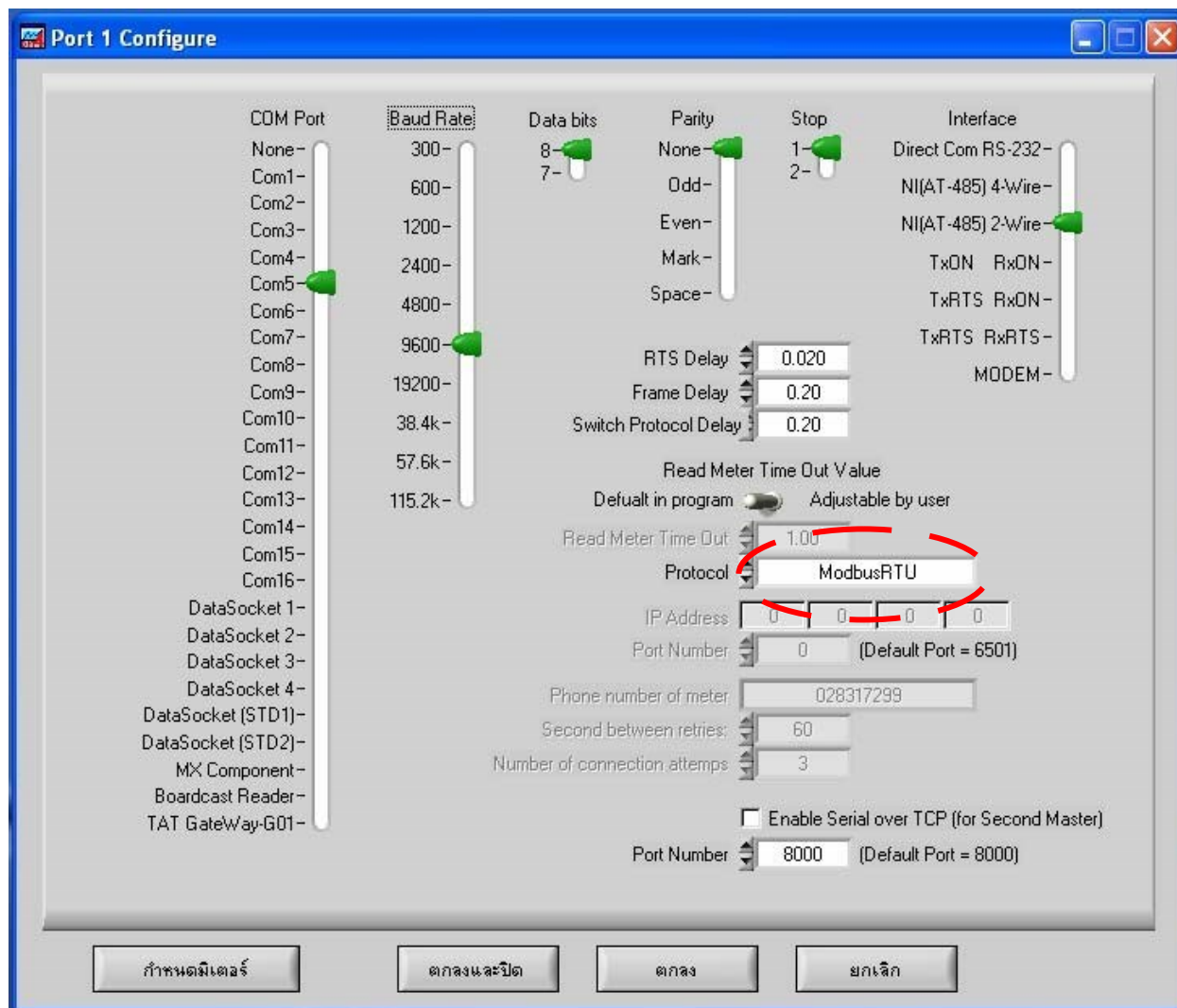
1.11 Select Stop as 1 figure 3

1.12 Select Interface as Direct Com RS-232 (If using a Converter RS485 to RS232) figure 3

1.13 Select Interface as NI(AT-485)2-Wire (If using a Converter RS485 to USB) Figure 3

1.14 Select Protocol as ModbusRTU Figure 3

1.15 Click OK and Close



Picture 3

1.16 Select the type of meter used as a model figure 2

1.17 Click the figure 2

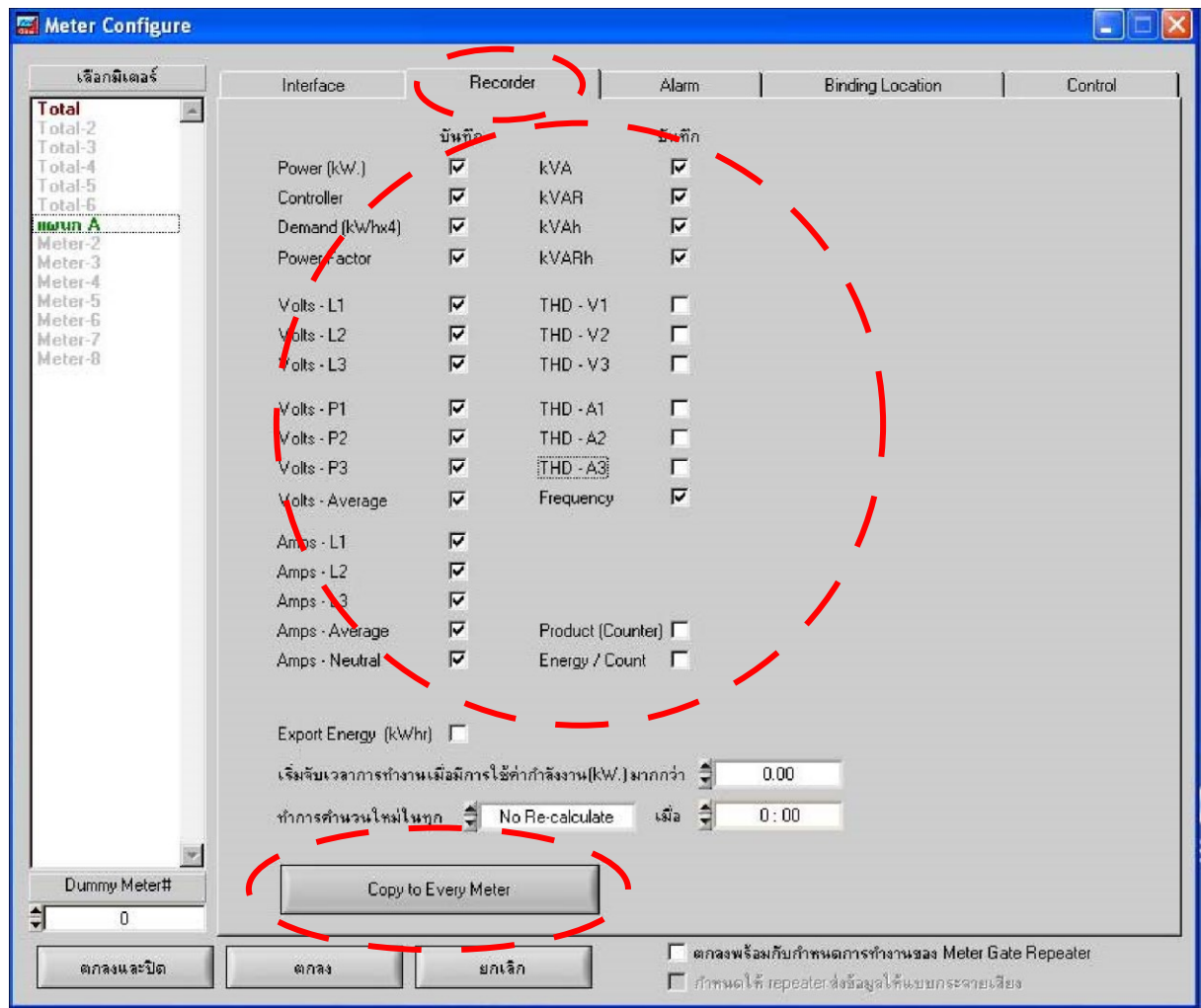
1.18 Click Quick Panel figure 2

1.19 Click Tab Bar Recorder figure 4

1.20 Click to record the electrical parameter figure 4

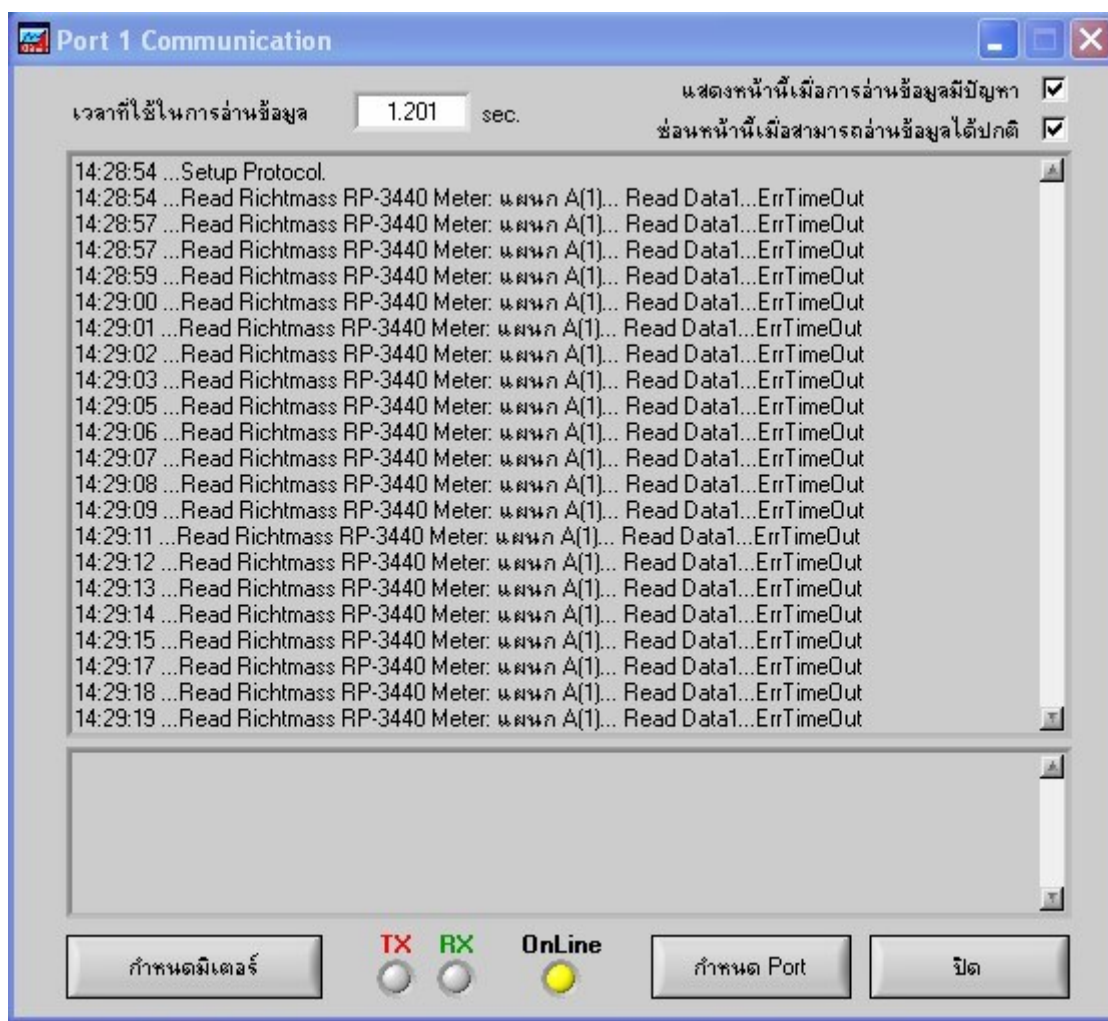
1.21 Click button Copy to Every Meter (In case of multiple Connection to the meter) figure 4

1.22 Click OK and Close



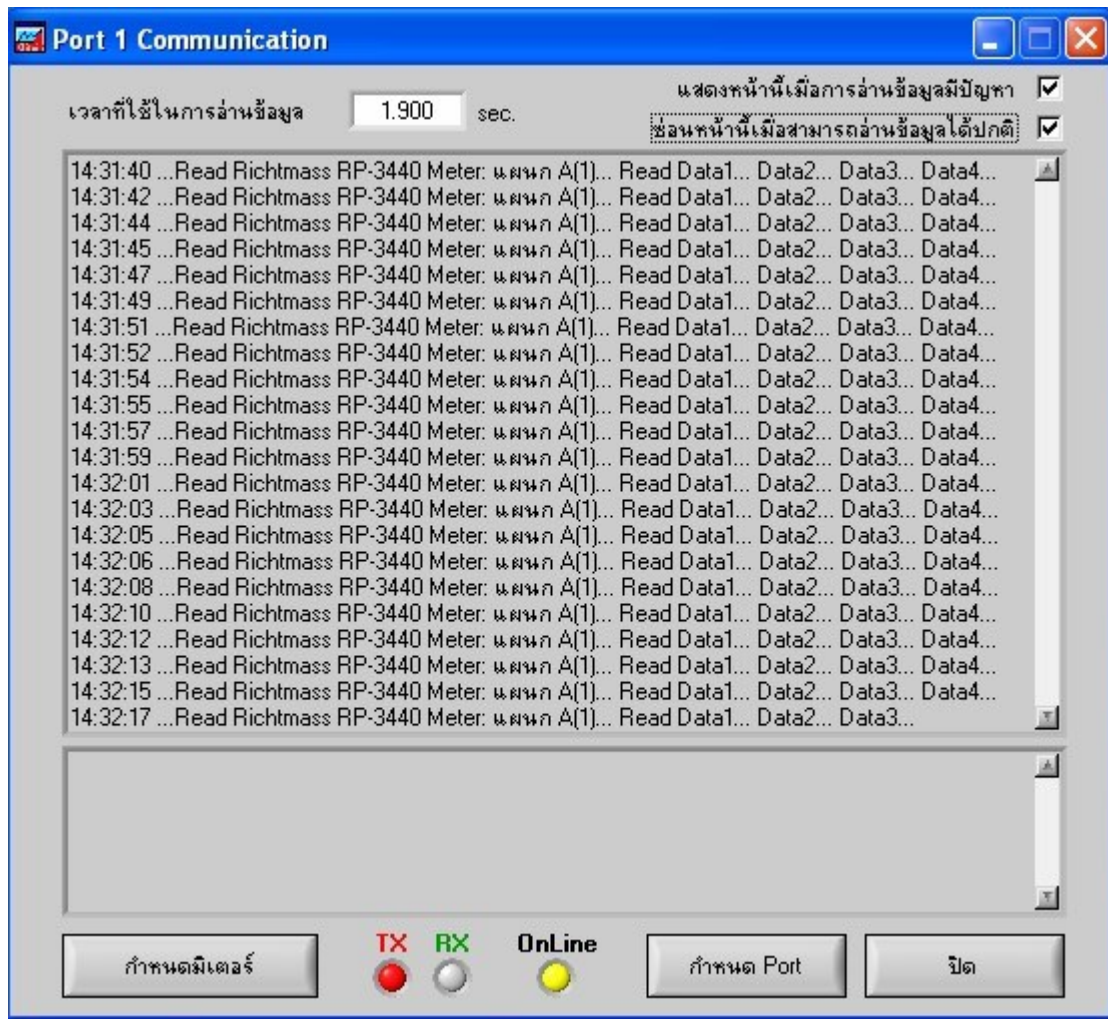
Picture 4 Display the Selected parameters to record Data

1.23 Press Channel communications to see if they are connected or not Figure 1



Picture 5 Show Channel

Figure 5 is a window of communication channel cannot read the data because it turns out that there is a message : Read Data...ErrTimeOut The solution is to switch to cable RS485 Converter Leg A and B (G leg without changes)



Picture 6 Show Channel

Figure 6 The window channel communications show Read Data1...Data2....Data3

This mean that the program can then be conneted to Power Meter Keep pressing Off

2. To view the electrical Parameter

To view the program Power Monitor Pro can be views 2 ways

2.1 Real time data is display on the electronic Program Delay of the Power Meter for about 1-2 second

2.2 Data is reported to view the information stored on the computer to see , this will look back .

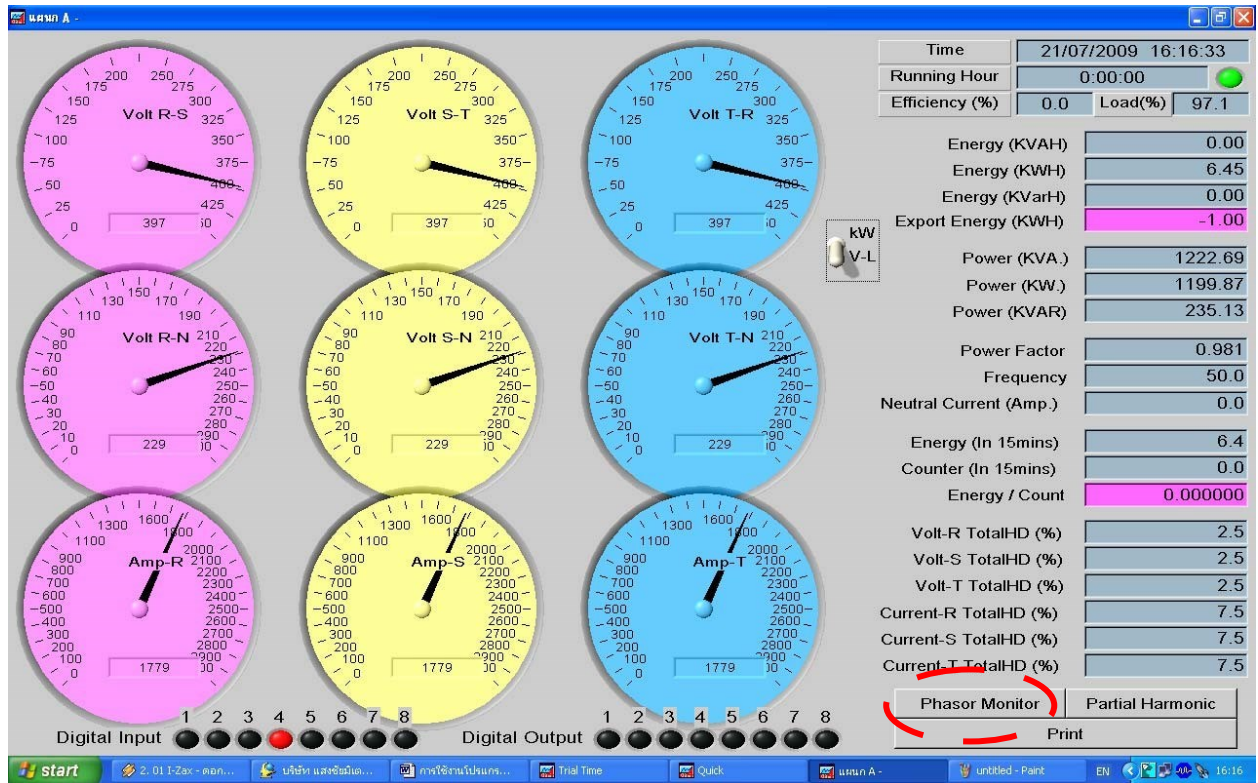


Picture 7

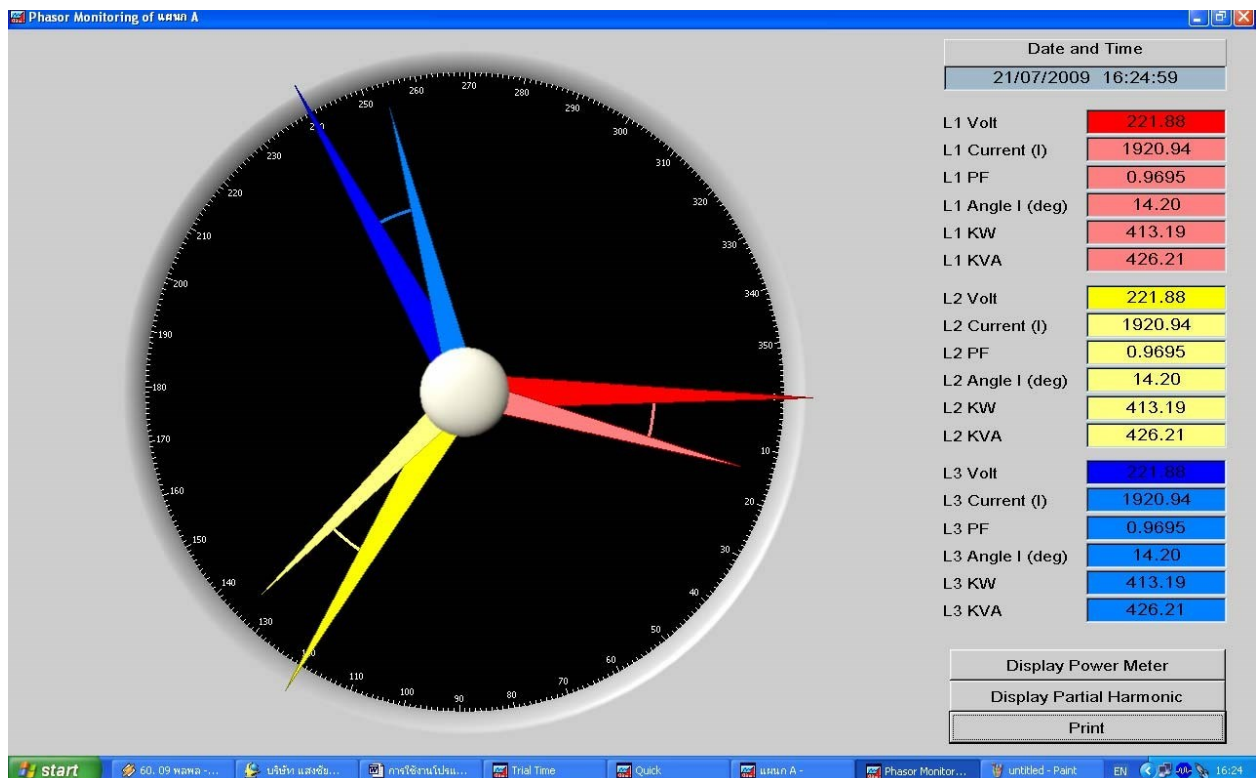
2.1 See Real Time Data

2.1.1 Analog Meter can be viewed by clicking on the name we set at Menu Quick Figure 7 is an example of a meter Department A Clicking on the meter will display a Analog Meter figure 8 we can see ,Volt L-N and Amp of the three phase simultaneously and on the right you can see the electrical parameter which are RealTime .

2.1.2 Phasor Monitor can be viewed by clicking on the button Phasor Monitor figure 8 it shows the phase angle between the electric current to voltage figure 9 .

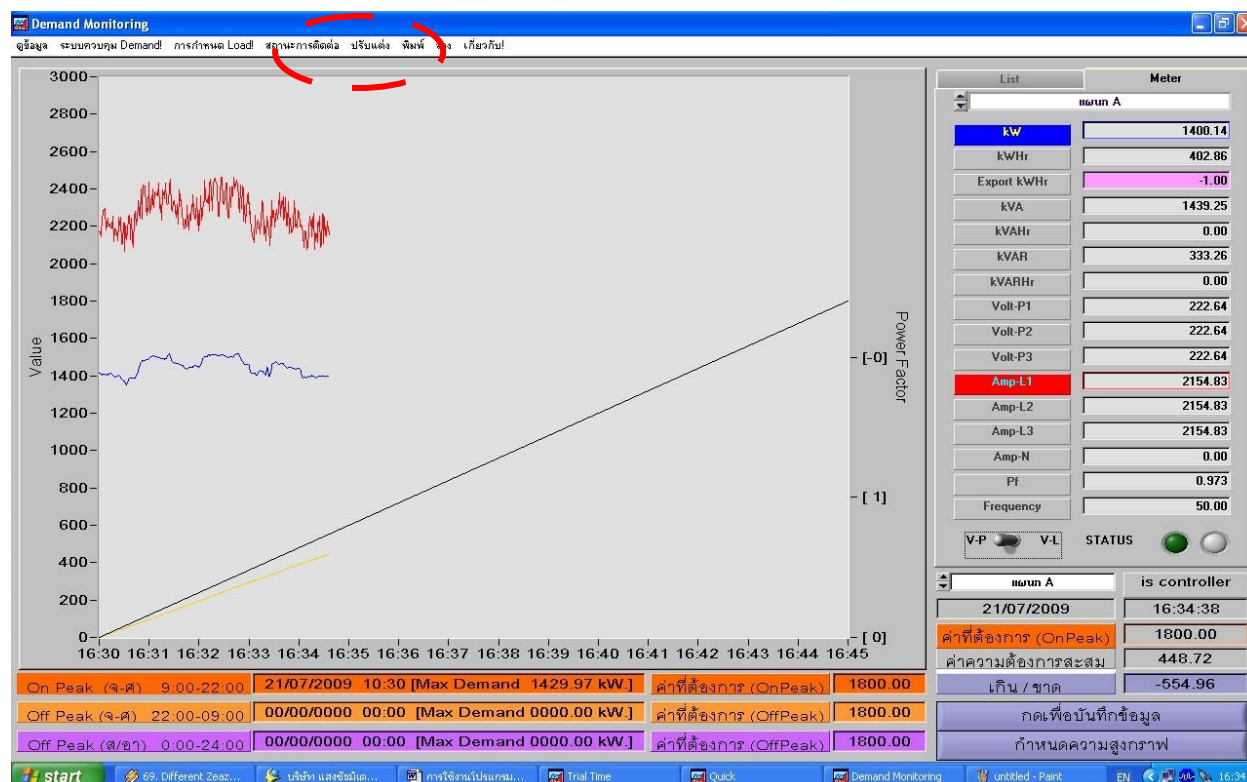


Picture 8 Analog Meter Display



Picture 9 Phasor Monitor Display

2.1.3 Watching the Demand can be viewed by clicking the view button , watching the demand window figure 10



Picture 10 Show Watching the Demand

Figure 10 Demand was watched by an electric charge, which can be seen at the window. There will be a 15 minute period. According to the Demand Charge and power up the right to show the power is real-time and the electric charge can be three types

TOD ,TOU and Normal and can also make holiday TOU clicking the Customize button. And data collection and **classification of the electric charge**. It is shown in Figure 11. In this section We can choose to charge for electricity. Named Project The Holidays TOU, click Customize, and then select **the Holidays (TOU)** are also shown in Figure 12.

Demand Setup

Demand Monitoring

☐ แสดงตาราง ☒ สีขลงตาราง ☐ สีขลงพื้น

Drive: C:\ Project Name: อนุรักษพลังงาน ตั้งโครงการใหม่

วิธีควบคุม

☐ ทยอยเรียน ☒ ตามลำดับความสำคัญ

Language

☒ Thai ☐ English

Operation Speed: Normal ปรับขนาด Window ได้ ☒

เปิดโปรแกรมแบบซ่อน ☐ Windows Lockout ☐

Automatic Delete/Move Data Use EE - AutoMove ☐

☐ กำหนดให้ทำการลบข้อมูล Second Data โดยอัตโนมัติ
ลบเมื่อข้อมูลมีอายุเกินกว่า (หน่วยวัน) 45

☐ กำหนดให้ทำการลบข้อมูล Demand Data โดยอัตโนมัติ
ลบเมื่อข้อมูลมีอายุเกินกว่า (หน่วยวัน) 210

☐ Move to: D:\Demand21.dat\Backup

☐ Export CSV file: D:\Demand21.dat\Export

Reporter: RICHTMASSpro-Reporter.Exe Browse...

AutoRun: TSS.EXE Browse...

(เวลาที่ใช้สำหรับลบข้อมูล Demand ควรจะมีค่ามากกว่า เวลาที่ใช้ลบข้อมูล Second Data)

Demand Mode

☐ Time of Day (TOD) ☒ Time of Use (TOU) ☐ Normal (24 Hours)

TOU Time

0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00

Begin of Onpeak: 9:00

Begin of Offpeak: 22:00

จำนวนค่า Demand ด้วย KW ☒ KVA

OK APPLY CANCEL

Figure 11

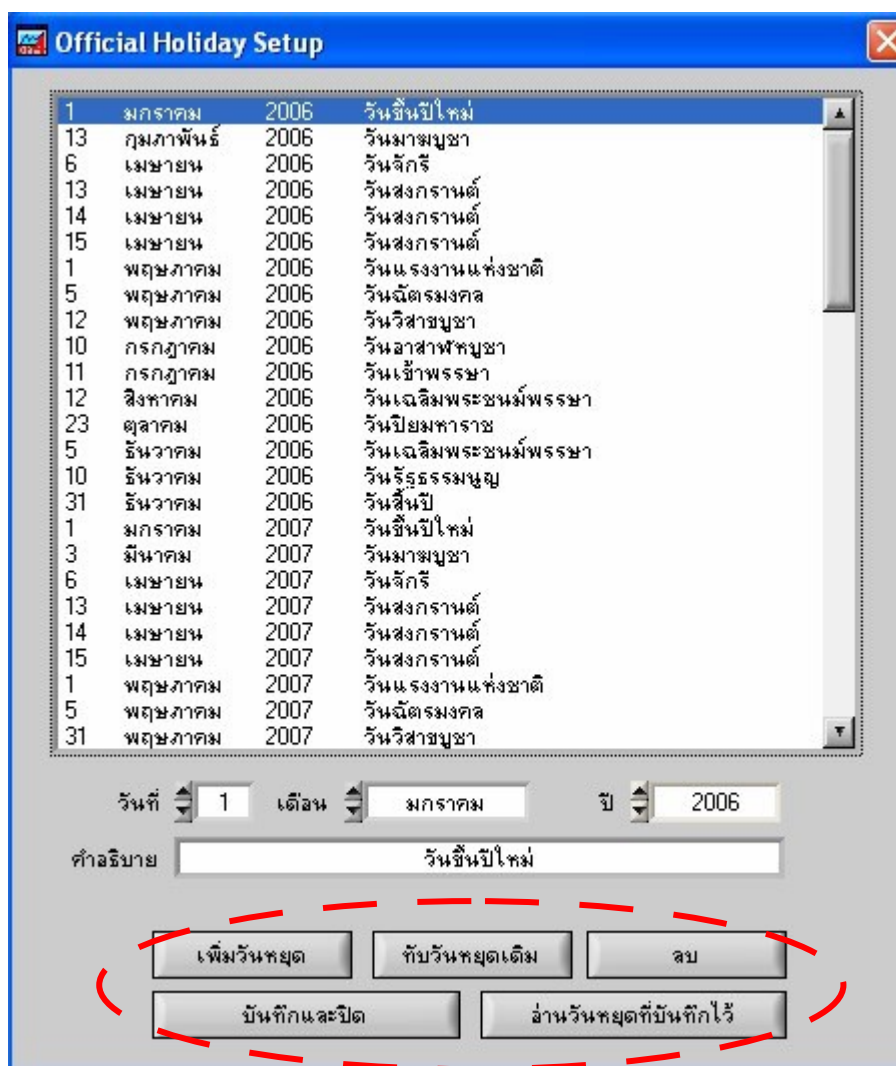


Figure 12

Figure 12 TOU The Holidays TOU by clicking the Add button, then the holiday date / month / year. And description Finally, click Save and Close (In the holiday TOU should be scheduled to coincide with the government. Because of the power of this kind of holiday. Electricity will be charged in the Holiday Peak, which is the rate of electric charge, unlike a normal day.)

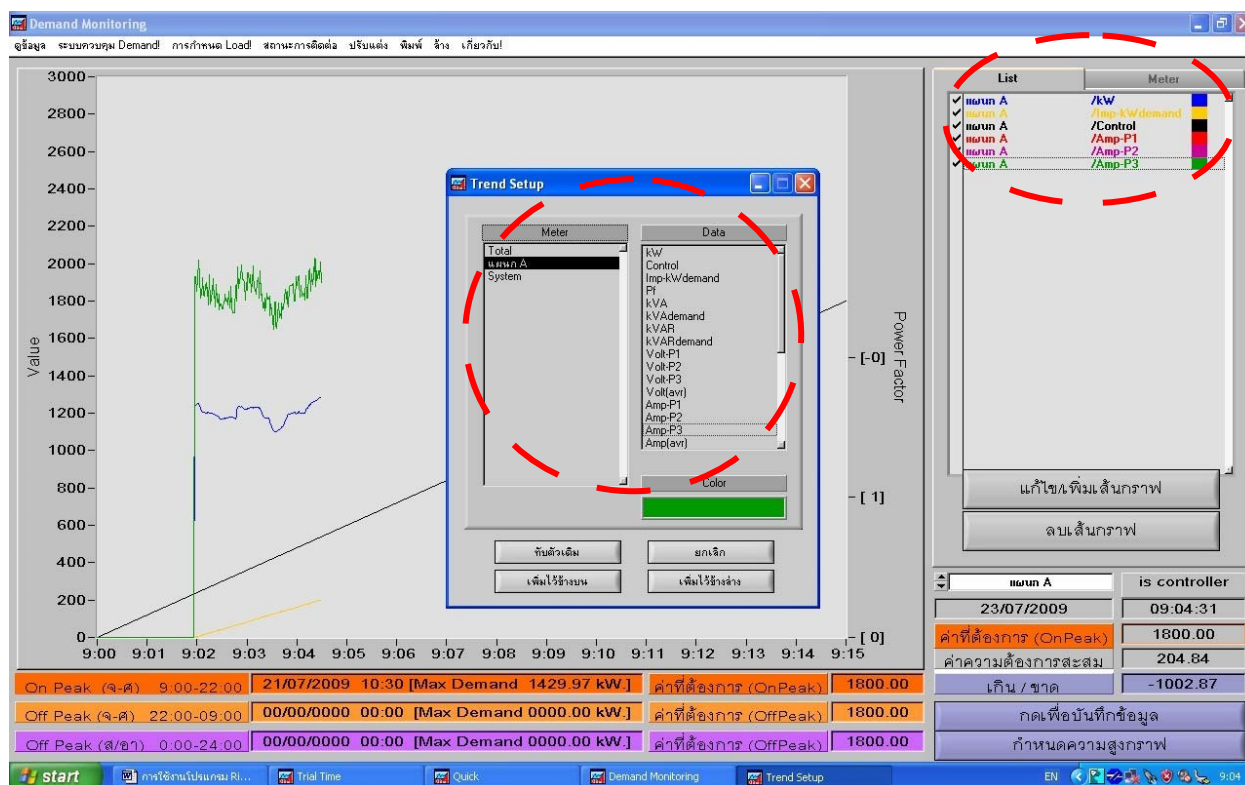


Figure 13

Figure 13 You can edit or add a line graph. List by clicking on the button, then click the button to edit / add curves. A window will appear. Click to select the parameters that we set. (On the left), then click on the electrical parameters that we want to see the graph. Then click the Add button above or lower .

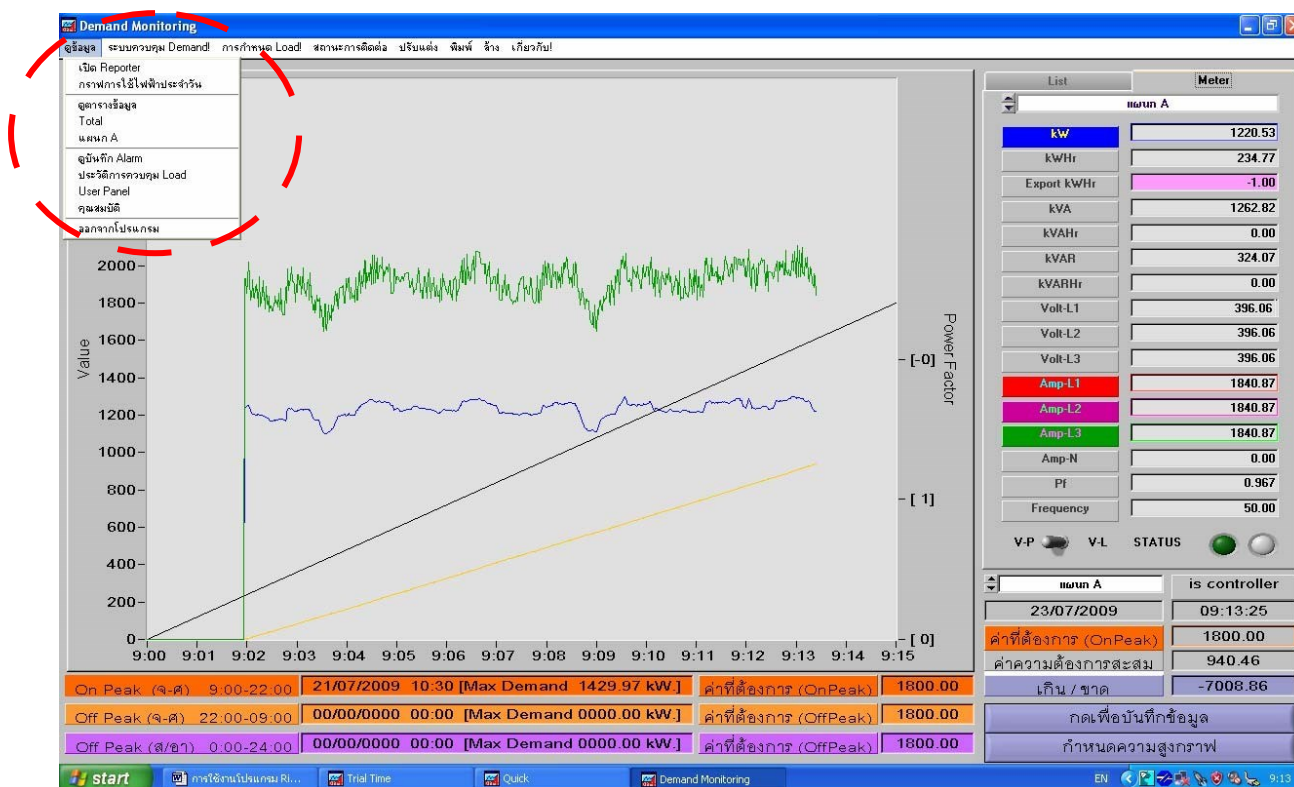


Figure 14

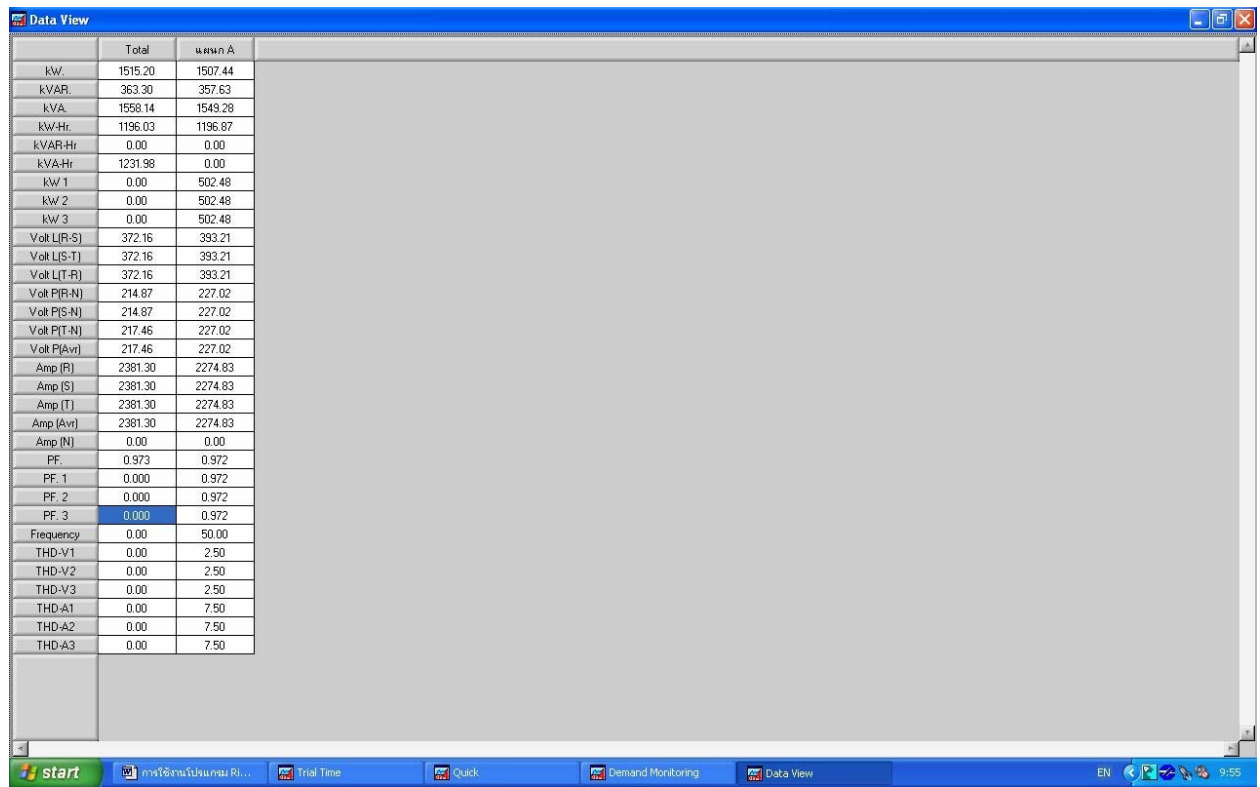
2.1.4 To view a graph of electricity daily. This method can not be viewed as a Real time, but there are advantages. We know that We use electricity during periods of high or low. which can turn any graph of electricity daily. From the menu **View graph of electricity daily**. Figure 14 is show in Figure 15.

2.1.5 To view the table The value of the electricity grid data. The reading will be Real time which can be opened by clicking the View / Table View Figure 14 is shown in Figure 16.



Figure 15 The graph shows the use of electricity daily.

Figure 15 The graph shows the daily use of the meter department A look at the graph of electricity usage is dated June 1, 2009. If we connect the meter is multiple ways to browse. Click on the title to see the meter, then select day / month / year to view the graph will show up. We can also scroll by pressing the red Cursor Left - right on your keyboard to view the data over time. The value will change as we move on to see it from the bottom.



| | Total | u.m.w.n A |
|-------------|---------|-----------|
| kW. | 1515.20 | 1507.44 |
| kVAR. | 363.30 | 357.63 |
| kVA. | 1558.14 | 1549.28 |
| kW-Hr. | 1196.03 | 1196.87 |
| kVAR-Hr. | 0.00 | 0.00 |
| kVA-Hr. | 1231.98 | 0.00 |
| kW 1 | 0.00 | 502.48 |
| kW 2 | 0.00 | 502.48 |
| kW 3 | 0.00 | 502.48 |
| Volt L(R-S) | 372.16 | 393.21 |
| Volt L(S-T) | 372.16 | 393.21 |
| Volt L(T-R) | 372.16 | 393.21 |
| Volt P(R-N) | 214.87 | 227.02 |
| Volt P(S-N) | 214.87 | 227.02 |
| Volt P(T-N) | 217.46 | 227.02 |
| Volt P(Avr) | 217.46 | 227.02 |
| Amp (R) | 2381.30 | 2274.83 |
| Amp (S) | 2381.30 | 2274.83 |
| Amp (T) | 2381.30 | 2274.83 |
| Amp (Avr) | 2381.30 | 2274.83 |
| Amp (N) | 0.00 | 0.00 |
| PF. | 0.973 | 0.972 |
| PF 1 | 0.000 | 0.972 |
| PF 2 | 0.000 | 0.972 |
| PF 3 | 0.000 | 0.972 |
| Frequency | 0.00 | 50.00 |
| THD-V1 | 0.00 | 2.50 |
| THD-V2 | 0.00 | 2.50 |
| THD-V3 | 0.00 | 2.50 |
| THD-A1 | 0.00 | 7.50 |
| THD-A2 | 0.00 | 7.50 |
| THD-A3 | 0.00 | 7.50 |

Figure 16 Show Table

2.2 View the Report View report We can observe that The window is a period of one month which has many advantages. We can compare the use of electricity each day, a figure that will see a 17 meter by 4 meter was named Division A, Division B, Section C and Section D. We can now see that each meter Demand How much is the maximum. How much is each KWh it is also available to view for 24 hours and can be done with the electric bill.

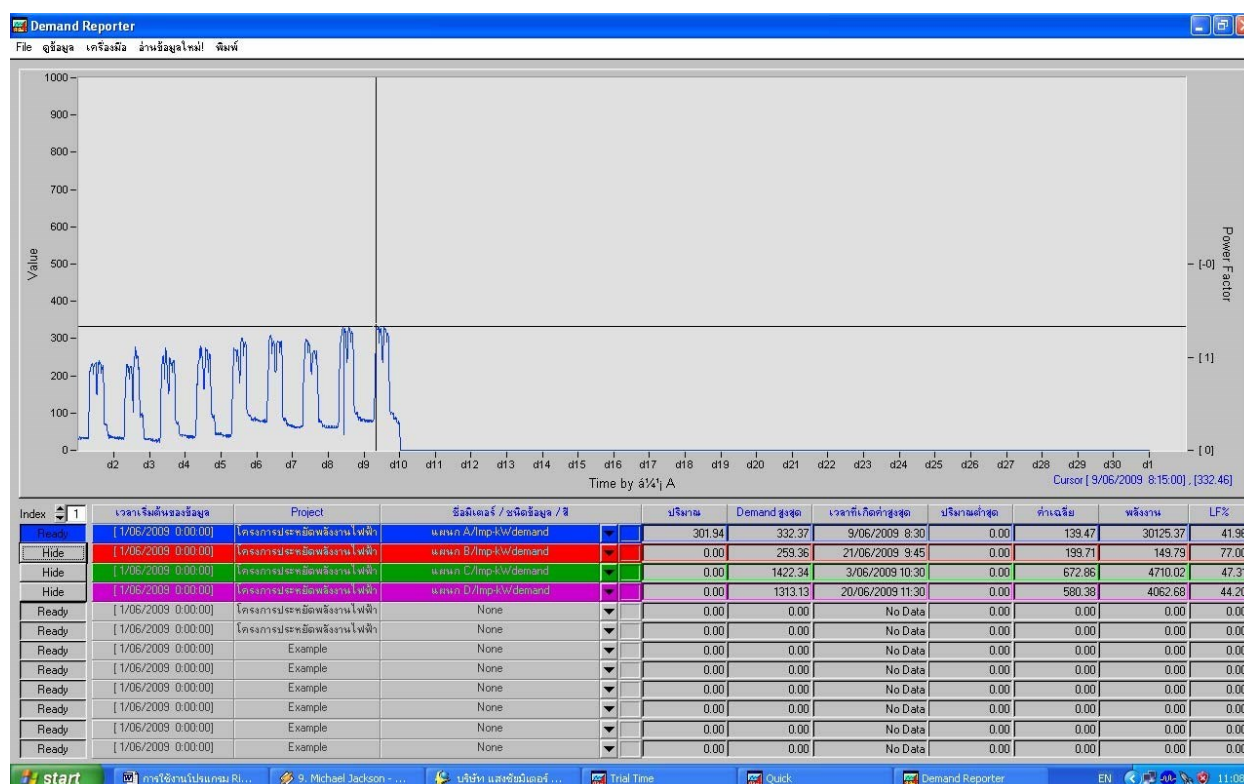


Figure 17

2.2.1 To start viewing reports

To start viewing report data to perform various settings. By right-clicking on the first row and select **Config graph**. (Right-click the first row only. If you right-click a row, and then select Config Graph will not be able to set the start and select View Project is named) figure 18

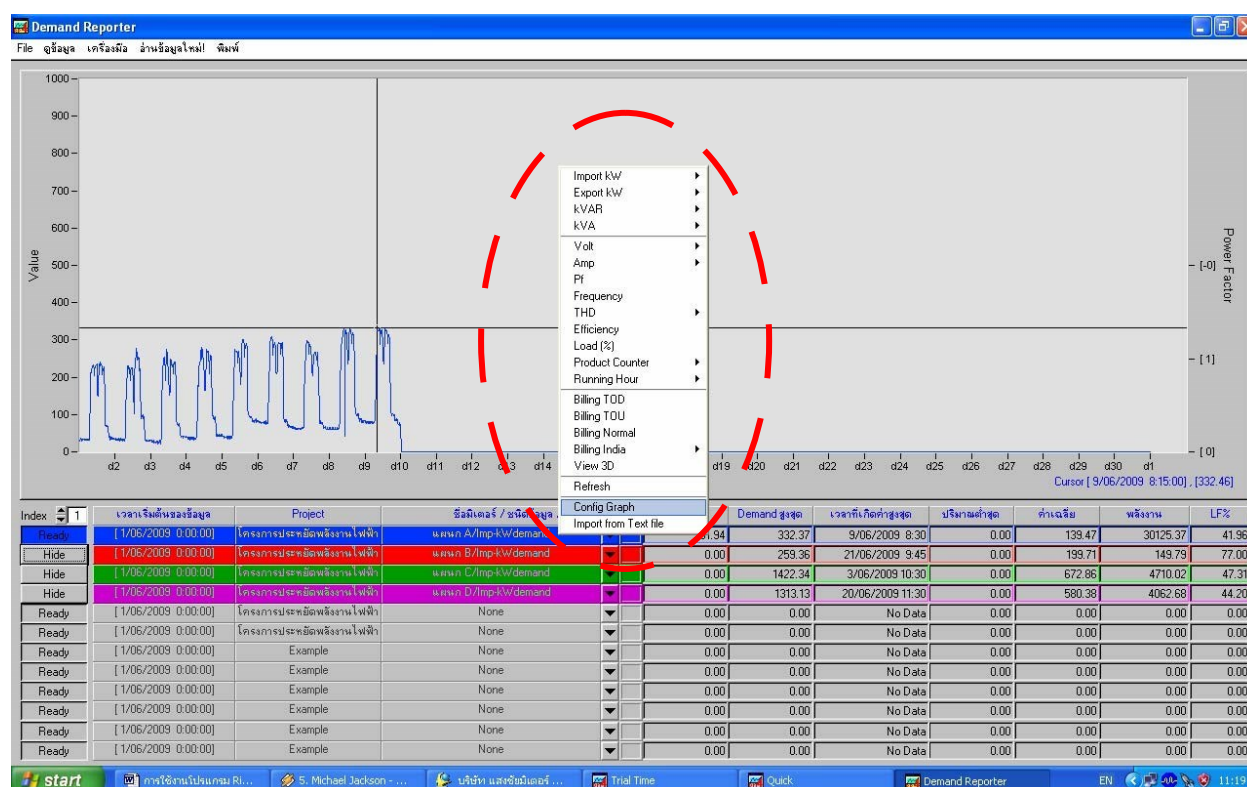


Figure 18

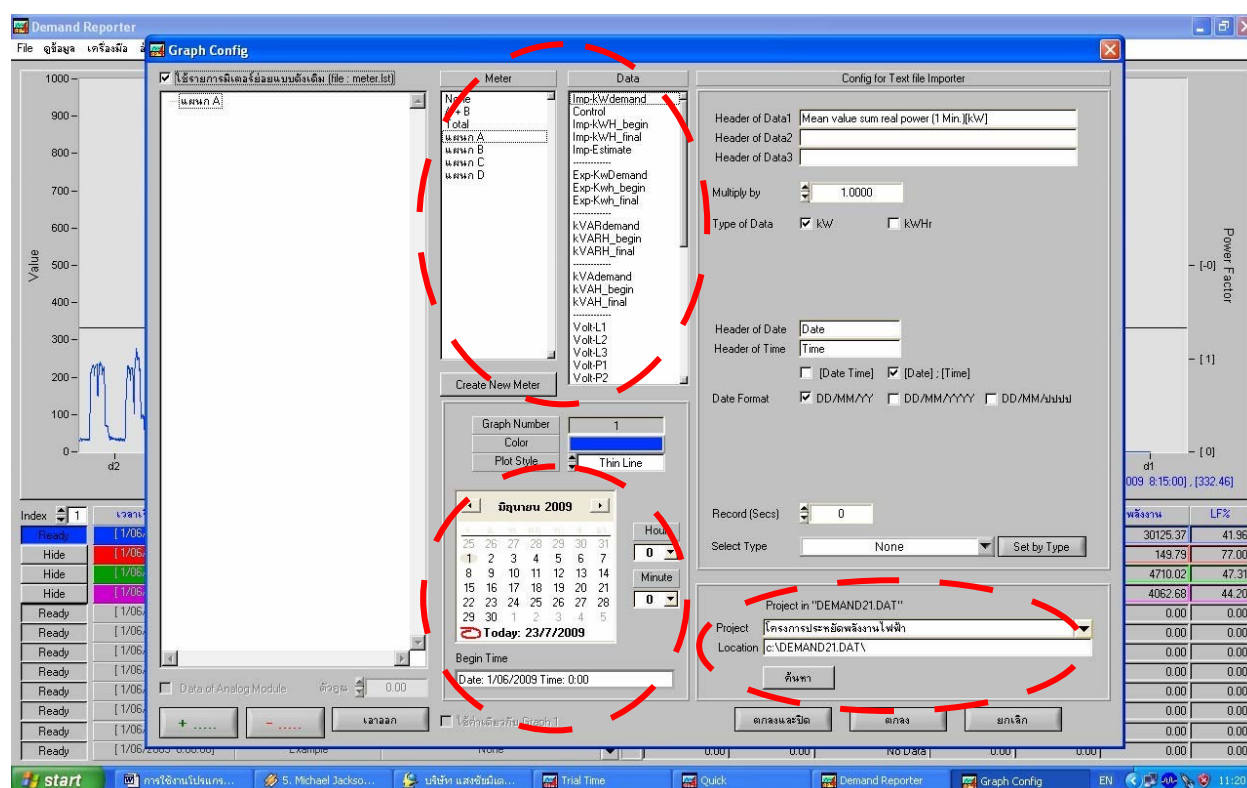


Figure 19

Figure 19 When we click Config Graph Window will show up

Which is what we need to do.

1. Click the Search button to bring up the name Project which we previously used. We drive by selecting the name and then select the Project DEMAND 2.1 DAT file, click on the Project name to see that we set. We click buttons and enter DONE.
2. Set the start time information (D /M /Y / Time) start time data should be set to coincide with the start up of electrical power.
3. Click on the title to see the meter data to see the information box, then click Meter Data Parameters box on the right and we can also choose the color of the graph we get to the bottom.
4. Click OK and Close

2.2.2 To view the data 24 hours

Viewing a 24-hour format has advantages over one month is able to see the behavior of electricity within the day. We want to know The example in Figure 20 for 9 days storage Demand the maximum time of 332.37 kw Maximum date is June 9, 2009 at 8:30 AM. If want to see the behavior of the electricity that is. Data can be viewed 24 hours a day by clicking the Mouse to position 9, and then right-click and select Get Info for 24 hours at 20, it will show up as a 24-hour Figure 21.

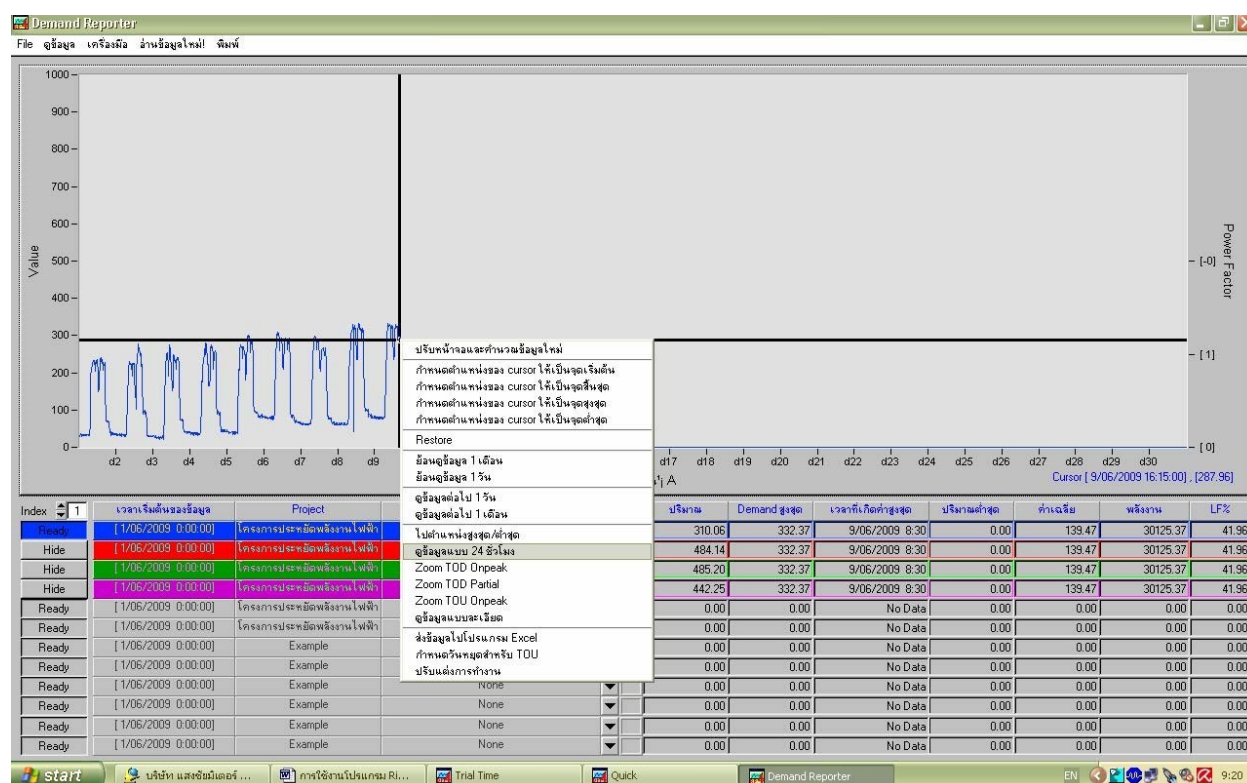


Figure 20

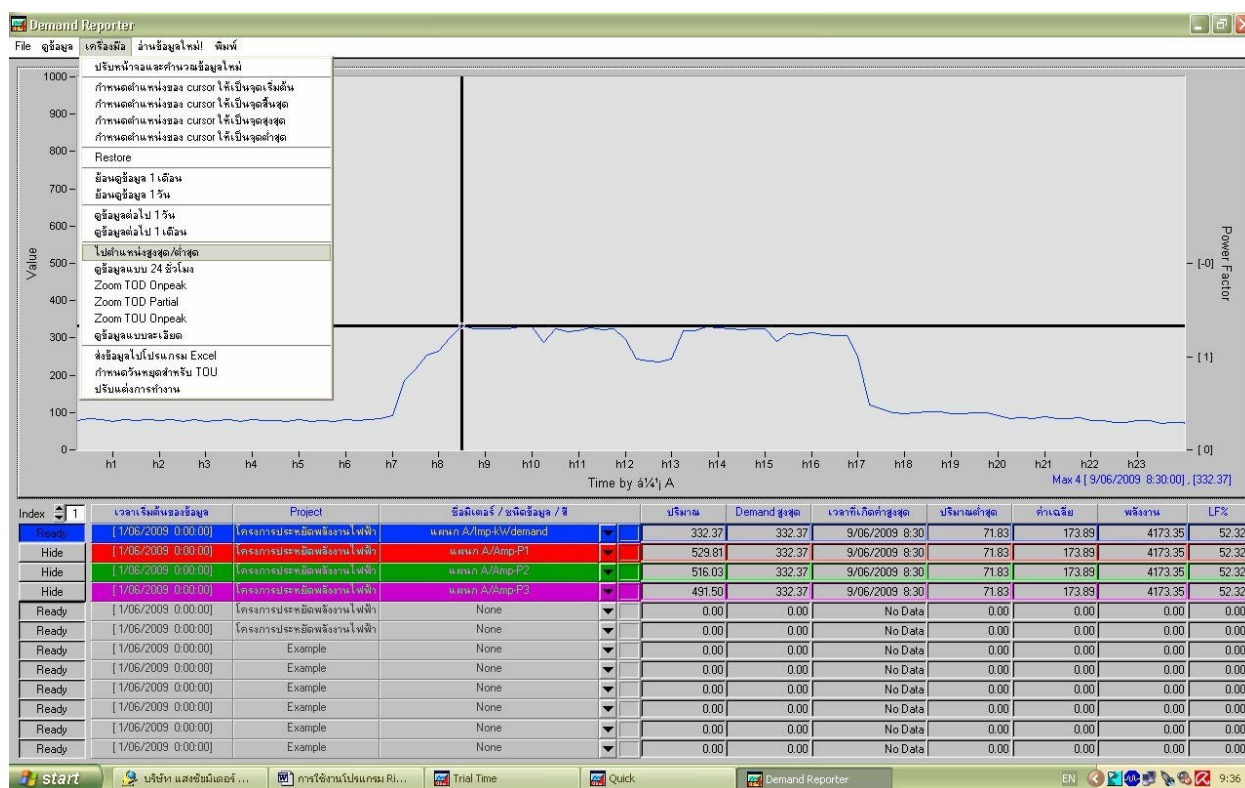


Figure 21

Figure 21 We can see the use of electricity at different times by moving left - right at the keyboard and can view the channel volume. In which the amount will vary according to a sliding button - left, right, and we can find the maximum / minimum by clicking on Tools and then select. To the maximum / minimum Cusor black, it will go to the maximum / minimum. (Clicking to the Max / Min Switching to the maximum / minimum. To return to a one-month data, right-click or click Tools, and then click Restore).

2.2.3 The electric bill

The program has a power monitor pro Another advantage is. Electric bill can have all three types of Normal, TOU, TOD. The method is

1. Select the start time of the data When we will start making electric bill and the time (How to select a start time of the data, see section 2.1).
2. Select the desired meter to electricity bills. (How to choose a meter, refer to section 2.1.)
3. Right-click the name we chose meter. Select from the Billing Normal,Billing, Billing TOU ,Billing TOD) By Type of electric charges we use is based on Figure 22 electric bill, it will show up as shown in Figure 23.

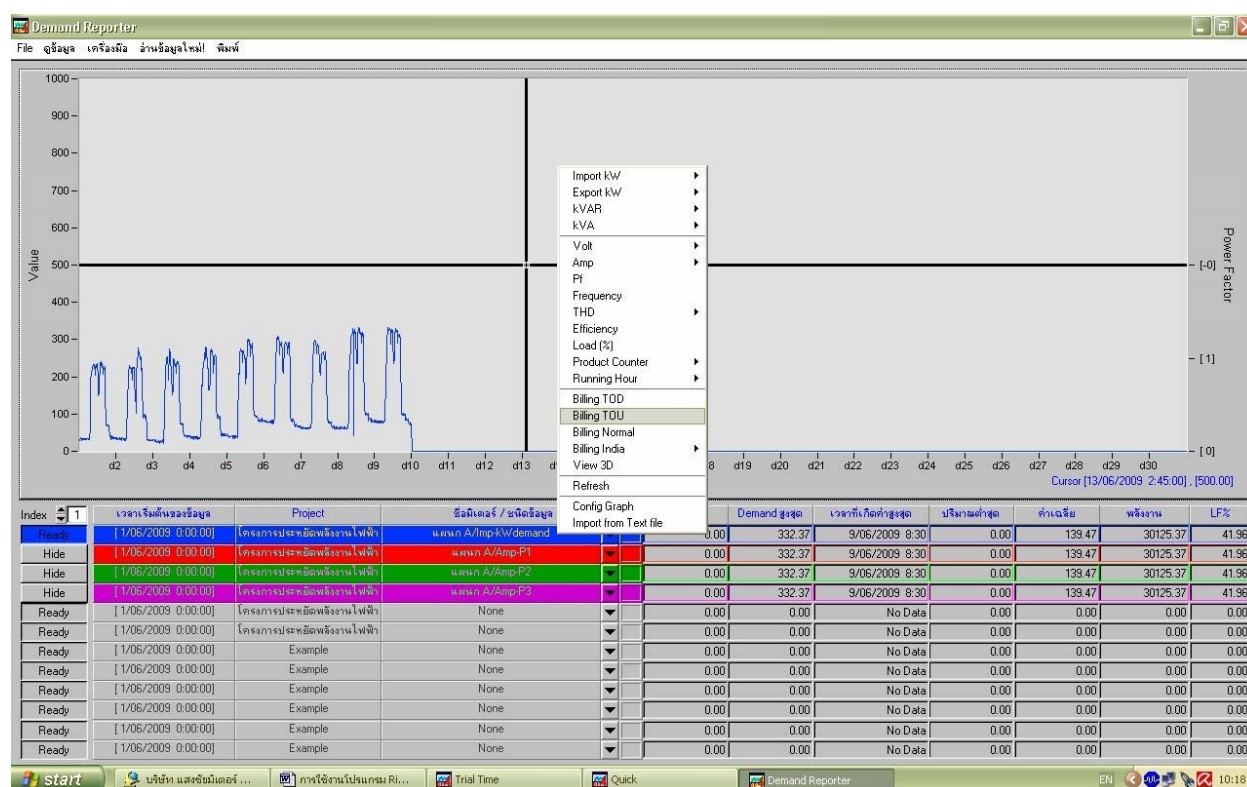


Figure 22

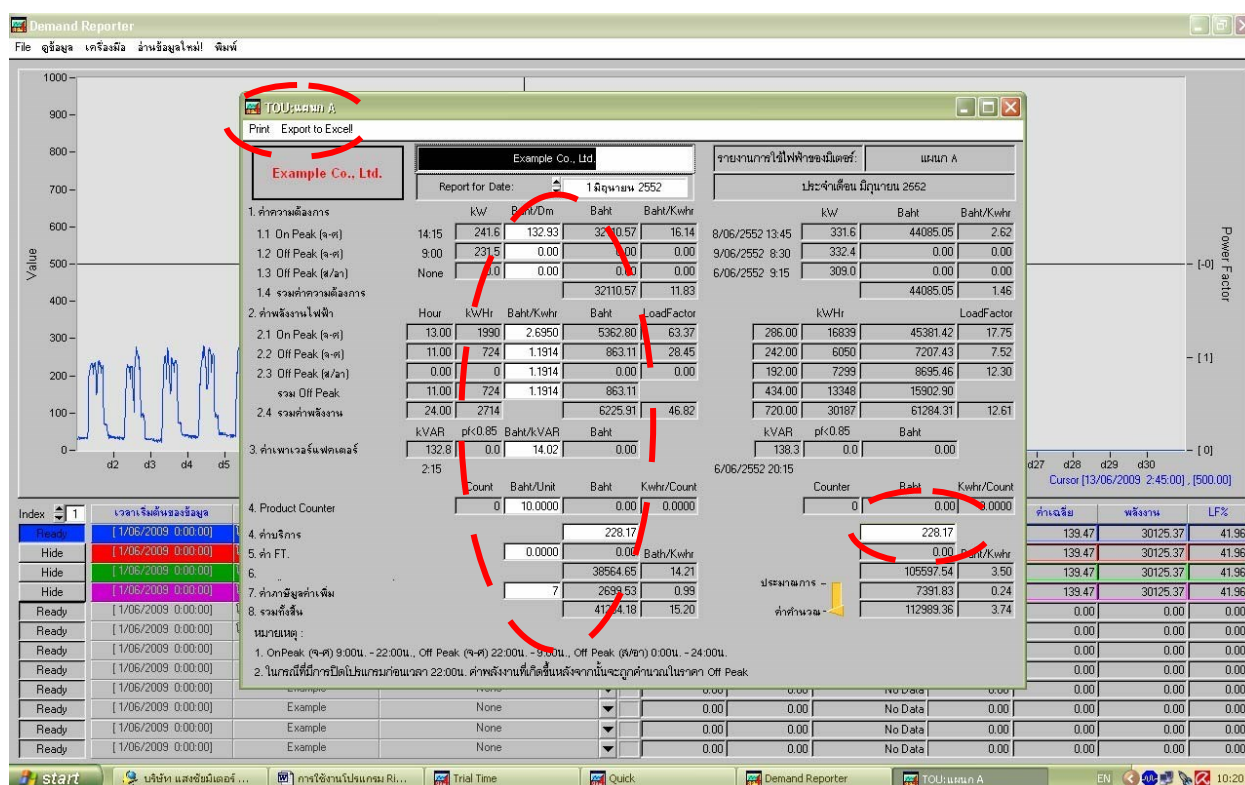


Figure 23

4. Enter amount in the white box. Each company will have different rates. The method is to look on the electric bill in your company ,how much rate
5. Electric bill has two parts: the electric bill Daily Report for Date, if we want to look at how much date. Click on the box Who is white, it appears that many. Choose up to us to see how much the electric bill on the monthly electric bill. This section will tell you that in the month. How much electric charge.
6. The program sends the data to Excel by clicking the Export to excel has the advantage of a program that sends data to an Excel data, which is a Chart Data Figure 24. 25,26,27 and 28

Microsoft Excel - แผนก A-TOU

วันที่ 1/6/2009

| A | B | On Peak 9:00-22:00 | | | | Off Peak 22:00-9:00 | | | | Holiday Peak (สงกรานต์และวันหยุด) | | | | Total 0:00-24:00 | |
|----|------------------|--------------------|--------------|---------|------------|---------------------|-------------|---------|------------|-----------------------------------|-------------|---------|------------|------------------|------------|
| | | Demand Peak (kW) | เวลา | จำนวน | Unit (kWh) | Demand Peak (kW) | เวลา | จำนวน | Unit (kWh) | Demand Peak (kW) | เวลา | จำนวน | Unit (kWh) | จำนวน | Unit (kWh) |
| 3 | Total | 331.641 | 6/6/09 13:45 | 296.000 | 16,839.116 | 332.367 | 6/6/09 9:30 | 242.000 | 6,049.551 | 308.999 | 6/6/09 9:15 | 192.000 | 7,296.523 | 720.000 | 30,187.190 |
| 4 | 1 มิถุนายน 2552 | 241.560 | 6/1/09 14:15 | 13.000 | 1,989.907 | 231.459 | 6/1/09 9:00 | 11.000 | 724.450 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 24.000 | 2,714.358 |
| 5 | 2 มิถุนายน 2552 | 278.440 | 6/2/09 14:15 | 13.000 | 2,072.502 | 231.626 | 6/2/09 9:30 | 11.000 | 676.885 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 24.000 | 2,749.367 |
| 6 | 3 มิถุนายน 2552 | 275.681 | 6/3/09 10:45 | 13.000 | 2,084.348 | 251.178 | 6/3/09 9:45 | 11.000 | 663.898 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 24.000 | 2,749.206 |
| 7 | 4 มิถุนายน 2552 | 278.801 | 6/4/09 10:00 | 13.000 | 2,288.167 | 236.987 | 6/4/09 8:45 | 11.000 | 731.643 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 24.000 | 3,019.811 |
| 8 | 5 มิถุนายน 2552 | 300.457 | 6/5/09 13:45 | 13.000 | 2,570.868 | 275.689 | 6/5/09 8:45 | 11.000 | 882.194 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 24.000 | 3,453.052 |
| 9 | 6 มิถุนายน 2552 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 308.999 | 6/6/09 9:15 | 24.000 | 9,795.807 | 24.000 | 3,795.807 |
| 10 | 7 มิถุนายน 2552 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 297.622 | 6/7/09 9:00 | 24.000 | 9,502.716 | 24.000 | 3,502.716 |
| 11 | 8 มิถุนายน 2552 | 331.641 | 6/8/09 13:45 | 13.000 | 2,916.749 | 311.737 | 6/8/09 9:00 | 11.000 | 1,113.770 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 24.000 | 4,030.519 |
| 12 | 9 มิถุนายน 2552 | 329.830 | 6/9/09 13:45 | 13.000 | 2,916.574 | 332.367 | 6/9/09 9:30 | 11.000 | 1,256.790 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 24.000 | 4,173.354 |
| 13 | 10 มิถุนายน 2552 | 0.000 | 1/0/00 0:00 | 13.000 | 0.000 | 0.000 | 1/0/00 0:00 | 11.000 | 0.000 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 24.000 | 0.000 |
| 14 | 11 มิถุนายน 2552 | 0.000 | 1/0/00 0:00 | 13.000 | 0.000 | 0.000 | 1/0/00 0:00 | 11.000 | 0.000 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 24.000 | 0.000 |
| 15 | 12 มิถุนายน 2552 | 0.000 | 1/0/00 0:00 | 13.000 | 0.000 | 0.000 | 1/0/00 0:00 | 11.000 | 0.000 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 24.000 | 0.000 |
| 16 | 13 มิถุนายน 2552 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 0.000 | 1/0/00 0:00 | 24.000 | 0.000 | 24.000 | 0.000 |
| 17 | 14 มิถุนายน 2552 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 0.000 | 1/0/00 0:00 | 24.000 | 0.000 | 24.000 | 0.000 |
| 18 | 15 มิถุนายน 2552 | 0.000 | 1/0/00 0:00 | 13.000 | 0.000 | 0.000 | 1/0/00 0:00 | 11.000 | 0.000 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 24.000 | 0.000 |
| 19 | 16 มิถุนายน 2552 | 0.000 | 1/0/00 0:00 | 13.000 | 0.000 | 0.000 | 1/0/00 0:00 | 11.000 | 0.000 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 24.000 | 0.000 |
| 20 | 17 มิถุนายน 2552 | 0.000 | 1/0/00 0:00 | 13.000 | 0.000 | 0.000 | 1/0/00 0:00 | 11.000 | 0.000 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 24.000 | 0.000 |
| 21 | 18 มิถุนายน 2552 | 0.000 | 1/0/00 0:00 | 13.000 | 0.000 | 0.000 | 1/0/00 0:00 | 11.000 | 0.000 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 24.000 | 0.000 |
| 22 | 19 มิถุนายน 2552 | 0.000 | 1/0/00 0:00 | 13.000 | 0.000 | 0.000 | 1/0/00 0:00 | 11.000 | 0.000 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 24.000 | 0.000 |
| 23 | 20 มิถุนายน 2552 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 0.000 | 1/0/00 0:00 | 24.000 | 0.000 | 24.000 | 0.000 |
| 24 | 21 มิถุนายน 2552 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 0.000 | 1/0/00 0:00 | 24.000 | 0.000 | 24.000 | 0.000 |
| 25 | 22 มิถุนายน 2552 | 0.000 | 1/0/00 0:00 | 13.000 | 0.000 | 0.000 | 1/0/00 0:00 | 11.000 | 0.000 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 24.000 | 0.000 |
| 26 | 23 มิถุนายน 2552 | 0.000 | 1/0/00 0:00 | 13.000 | 0.000 | 0.000 | 1/0/00 0:00 | 11.000 | 0.000 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 24.000 | 0.000 |
| 27 | 24 มิถุนายน 2552 | 0.000 | 1/0/00 0:00 | 13.000 | 0.000 | 0.000 | 1/0/00 0:00 | 11.000 | 0.000 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 24.000 | 0.000 |
| 28 | 25 มิถุนายน 2552 | 0.000 | 1/0/00 0:00 | 13.000 | 0.000 | 0.000 | 1/0/00 0:00 | 11.000 | 0.000 | 0.000 | 1/0/00 0:00 | 0.000 | 0.000 | 24.000 | 0.000 |

OnPeak Chart / OffPeak Chart / Holiday Chart / Total Energy Chart / Data

Figure 24 The data Model

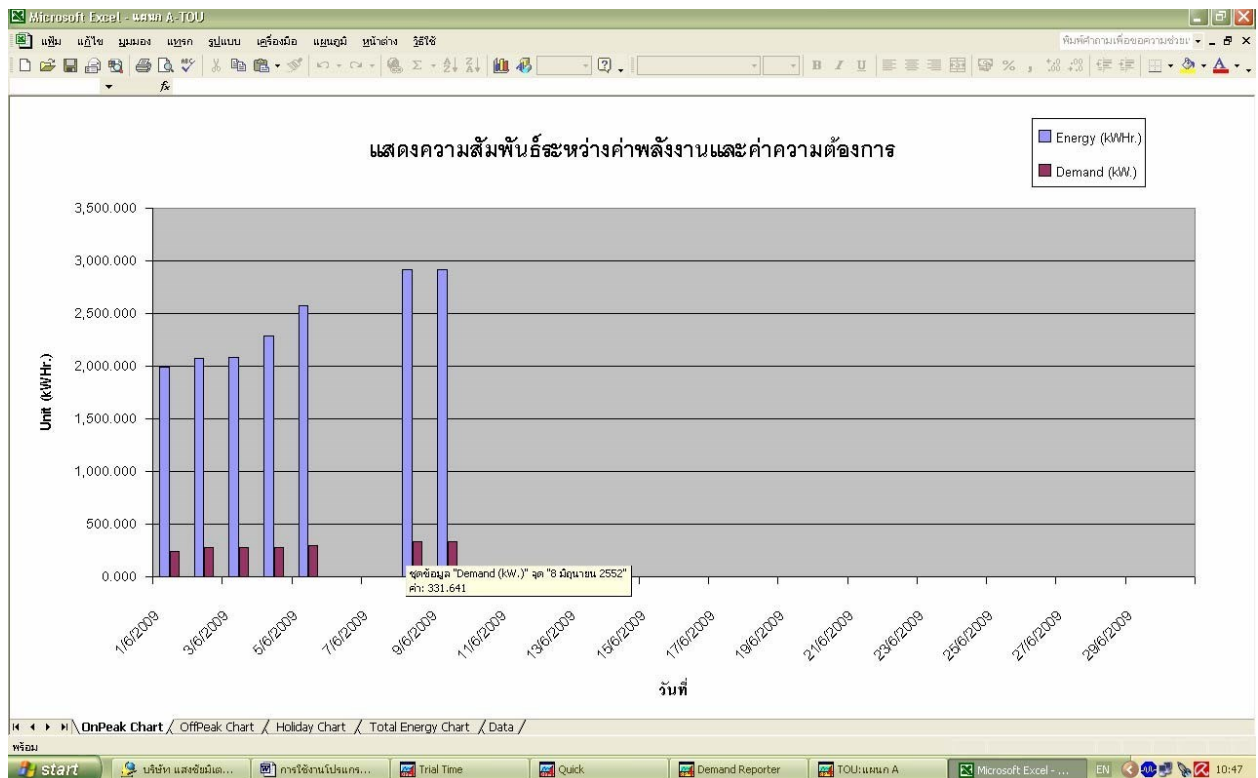


Figure 25 Graph On Peak

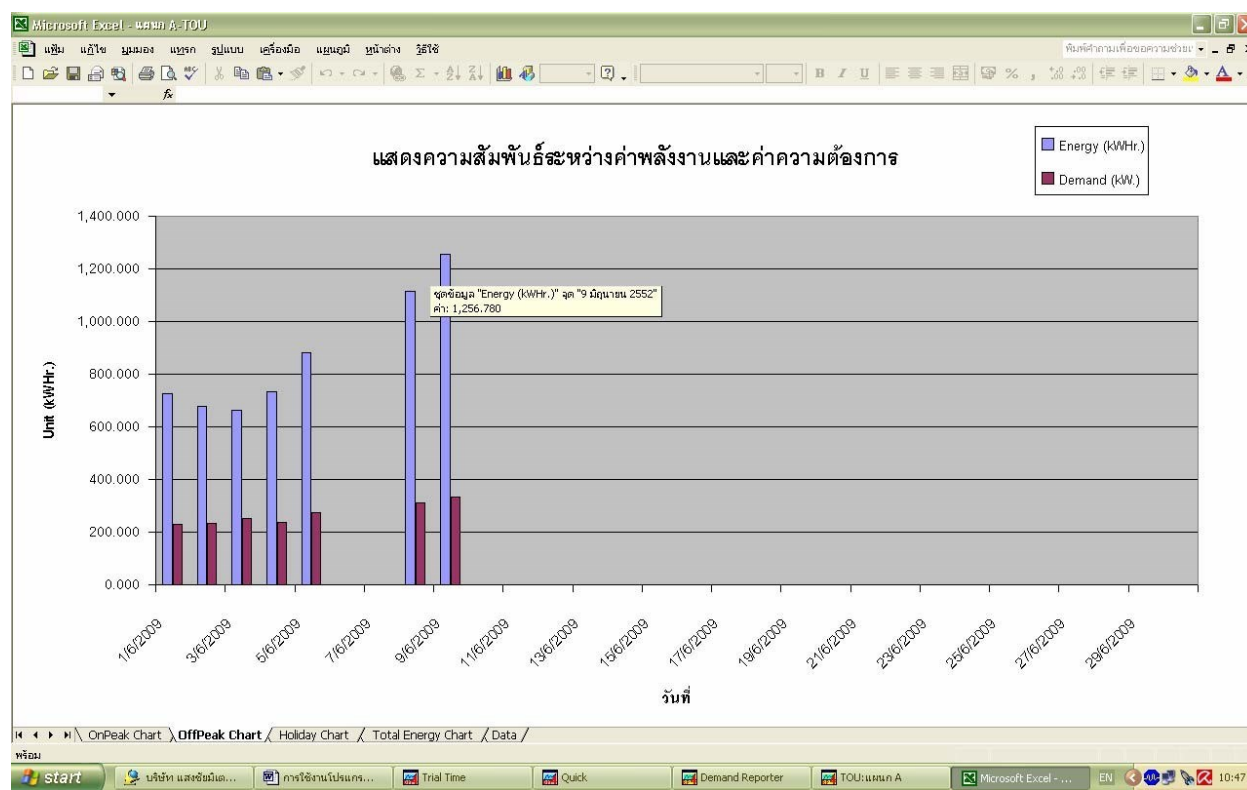


Figure 26 Graph Off Peak

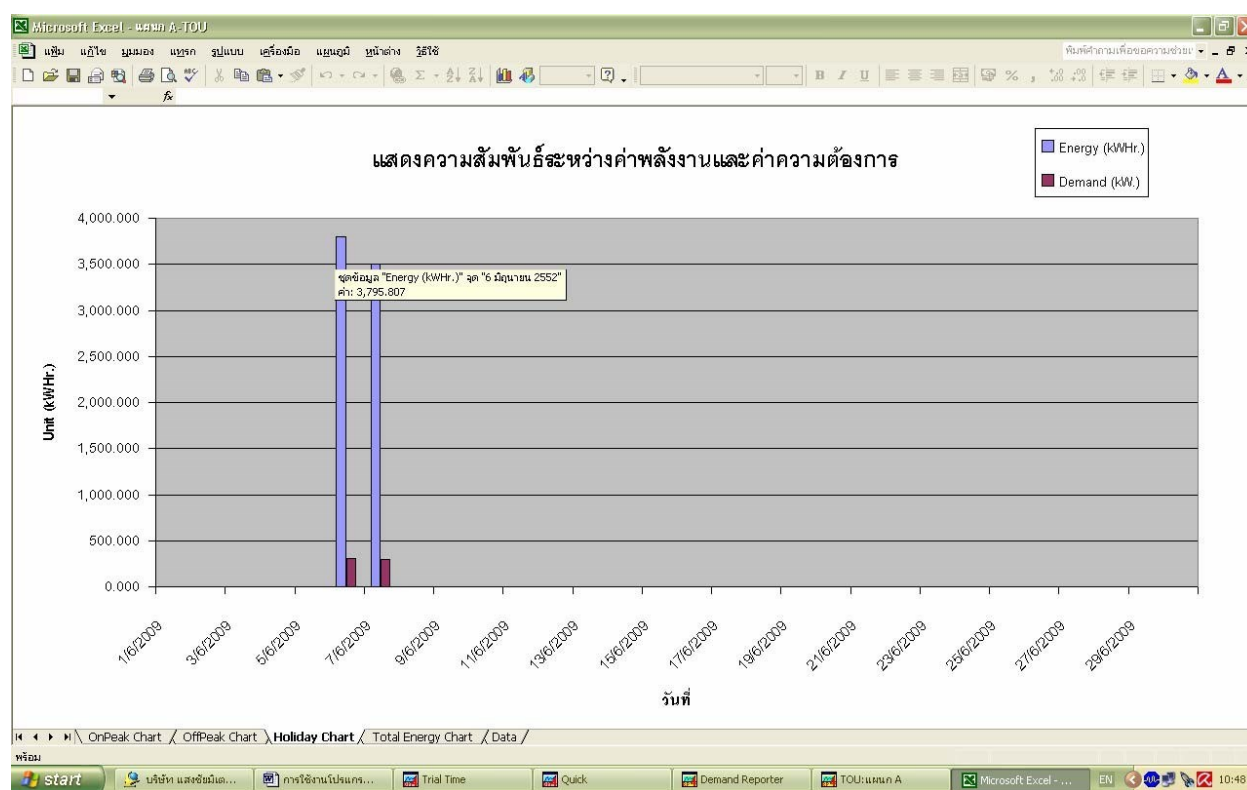


Figure 27 The graph shows the weekend and the holiday message on occasion

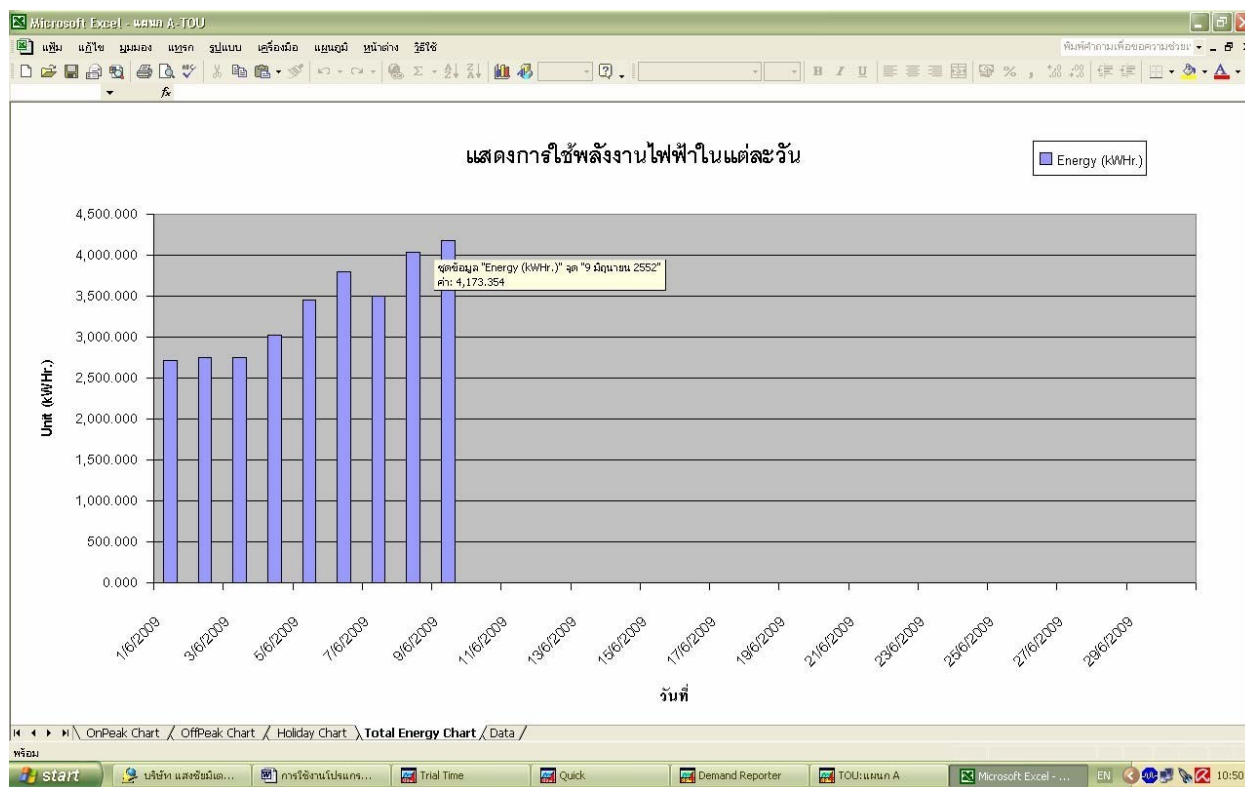


Figure 28 Graph kWhr



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