COMPARATIVE STUDY ANALYSIS OF DAILY LOAD CURVE ON DIFFERENT TARIFFS USING MATLAB

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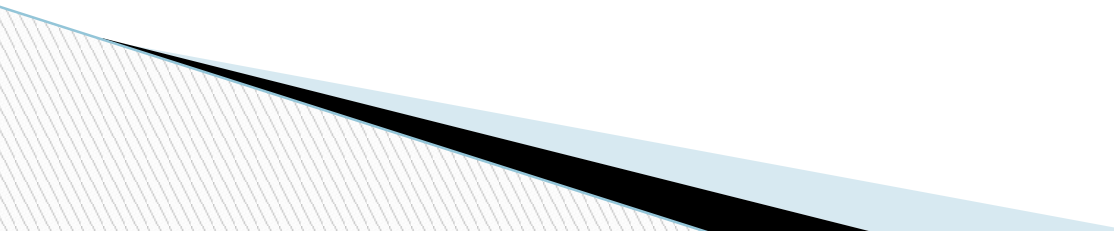**V.Sabarisha**   **T.Udhaya**   **N.Yuva priya**   **S.Vijay Anandh**
II Year/EEE   II year/EEE   II year/EEE   II year/EEE
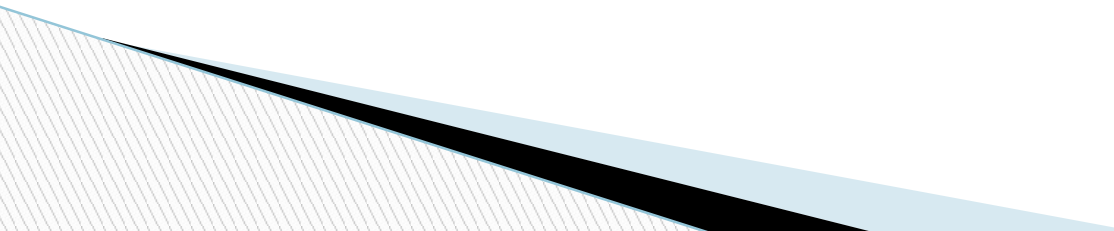RIT   RIT   RIT   RIT

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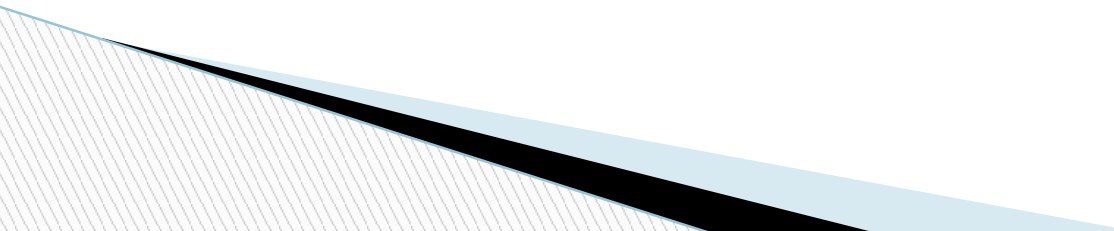- Conclusion
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Objective

- To study and analyse the load requirement of the domestic, commercial and industrial sector

- To plot the data in a graphical form to understand the demand of electricity during the various time period of the day

- Thus MATLAB can be used for the interpretation and

- To predict and find the optimum plants to operate round the clock and the peak load power plants to create awareness to the people and minimize the cost per unit

INTRODUCTION

❏ By using huge amount of electrical and electronics appliances, the energy consumption and the demand for electrical energy is increasing.

❏ Huge amount of electricity is used during summer.

❏ Electricity demand is increasing about twice as fast as overall energy use and is likely to rise by more than half to 2040

INTRODUCTION

- **Load factor** is **a useful indicator for describing the consumption characteristics of electricity over a period of time**.

- **Tariff** is used to **protect newly established domestic industries from foreign competition.**

- **MATLAB** is a high-level language for numerical computation, visualization and application development**.**

Literature review

SI.NO	Authors Names	Title of the Journals & Journals publishes	Inferences
1	Pedro M.Lara Santillan , Montserrat Mendoz Villena, L.Alferdo Fernanoz jimensoz and Mario Manana canteli	"A compartative study of electric Load curve changes in an uraban Low voltage substation in spain during the Economic crisis (2008-2013)", Hindawi Publishing corportation The scientific journal	It proposed that energy consumption in urban location during economic crisis . Also states that changes in the consumer needs also detecting the time in load curves. Two curves were chosen for the parameter such as neighbor curve and base date curve. Night time during summer month's period usage of electric current is high so it is the main reason for crisis
2	Kajal gaur, Harish kumar Rathour, P.K.Agarwal, K.V.S Baba, and S.K. Soonee,	"Analysing the electricity demand pattern"	It has the load characteristic curve is complex due to factors like weather reports, geographical diversity, times. Through inspecting , computer model appears 92% of variations happens in peak demand – temperature, humidity, and sunset variable.

Literature review

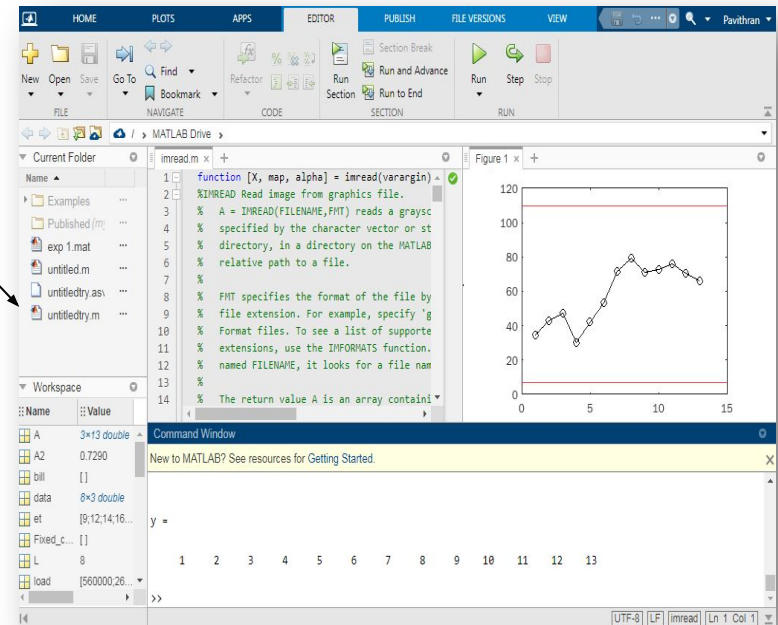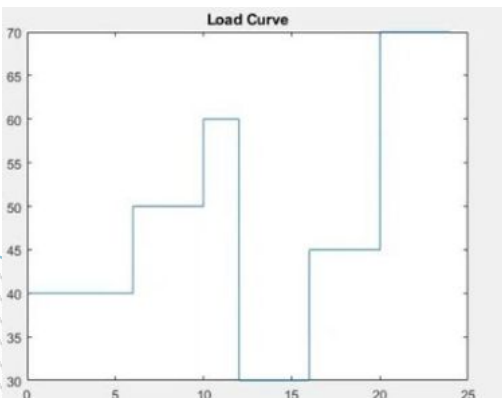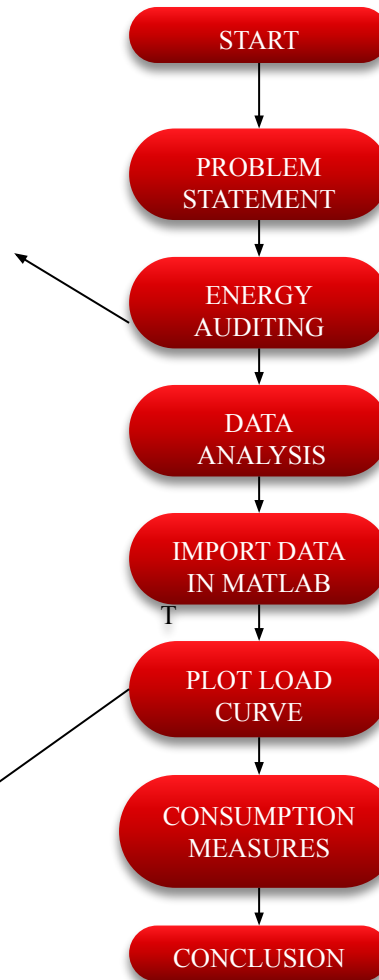| SI.NO	Authors Names	Title of the Journals & Journals publishes	Inferences
3	Ferdinando Salata, Andrea de lieto vollaro and Roberto de leito vollaro,	A case study of technical nad economic comparison among energy production systems in a complex of historic buildings in Rome 68th conference of the italian theraml machines enginering association	It proposed that single source of electricity produced in residential sector in trigeneration system. To satisfy the demand of electricity and thermal energy can be analyzed by RET screen software to control the waste
4	Gousia Sulatana and Harsha h u ,	"Electrical energy audit a case study" IOSR Journal of electrical and electronics engineering	It is used to conducting the energy audit in Nandi Institute of Technology and management sciences, Bangalore to find the energy consumed in a day, month , week. From the cost effective measures taken to increase the efficiency use of power. It reduced demand rate 41.66% of the energy and 30.6% of cost reduction. It will do continuously.

Literature review

SI.NO	Authors Names	Title of the Journals & Journals publishes	Inferences
5	Issac kofi nti, Moses Teimeh, Owusu nyarko boatteng and adebayo felix adekoya ,	"Electricity load forecasting: a systematic review" Journal of electrical systems and information technology	It is used proposed that global demand of electricity rate is increasing in this modern world especially in residential and commercial purposes. Load forecasting plays a vital role creates the problem in the power sector. Forecasting algorithms fitting in the field root mean square error.
6	Nissanaga nishad rasanjan mendis and nisal perera	"Energy audit: a case study"	It is used to identify the potential savings and implementation in industrial safety. It leads to reduce the energy bills and improve the efficiency in textile industry.

Literature review

Sl.NO	Authors Names	Title of the Journals & Journals publishes	Inferences
7	Shivam M, A.Ansari, Aruna pathak	"Electrical enrgy audit for an institution" international journal of advanced science and technoloy	It proposed that seek the opportunities to balance the energy feed system without change into desired output. It could reduce the cost. LED replaced by CFL and fluorescent lights minimize the cost and achieving sustainable energy
8	Matteo Dongellini, cosimo marinnosci, and Gian luca morini,	"Energy audit for an industrial site A case study" 68th conference of the italian theraml machines enginering association	It is used to study energy audit carried out on eight primary large industry buildings. In order to analyze the impact of energy saving functions. It helps the path to continue the method in future for using energy efficiently.

Methodology

START

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PROBLEM STATEMENT

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ENERGY AUDITING

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DATA ANALYSIS

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IMPORT DATA IN MATLAB

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PLOT LOAD CURVE

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CONSUMPTION MEASURES

↓

CONCLUSION

Energy audit - sample

1. <u>Domestic -</u>

     Location : 2184/7H, Sri Srinivasa Nagar, Theivanai Nagar, Sivakasi 626 123

2. <u>Commercial -</u>

     Vahini complex , Theivanai Nagar, Near Shruthi Hospital, Sivakasi - 626123

3. <u>Industrial -</u>

     Coronation Arts and Crafts, 343, Thiruthangal Rd, Parasakthi Colony, Sivakasi, 626123

ENERGY AUDIT

DOMESTIC: (1kwh = 1 unit = 1000 watts/hr= 0.001mwh)

SI.NO	Time(hrs) in a day	Load curve(starting point-ending point)	Load difference(KWh)
1	6	00:00-06:00	0.4
2	2	06:00-08:00	0.8
3	2	08:00-10:00	0.6
4	2	10:00-12:00	0.3
5	2	12:00-14:00	0.2
6	2	14:00-16:00	0.3
7	2	16:00-18:00	0.3
8	2	18:00-20:00	0.5
9	2	20:00-22:00	0.4
10	2	22:00-24:00	0.3

Domestic Monthly EB bill Reading

SI.NO	Date	Readings (units)
1	26/10/2021	140
2	24/08/2021	120
3	25/06/2021	120

ENERGY AUDIT

COMMERCIAL:

SI.NO	Time(hrs)	Load curve(starting point-ending point)	Load difference(KWh)
1	6	00:00-09:00	0.0
2	2	09:00-12:00	1.2
3	2	12:00-14:00	0.8
4	2	14:00-16:00	0.85
5	2	16:00-18:00	0.9
6	2	18:00-20:00	0.8
7	2	20:00-22:00	0.3
8	2	22:00-24:00	0.2

Complex Monthly EB bill Reading

SI.NO	Date	Readings (units)
1	24/11/2021	153
2	22/10/2021	150.5
3	23/09/2021	154.09

ENERGY AUDIT

INDUSTRIAL:

SI.NO	Time(hrs)	Load curve(starting point-ending point)	Load difference(KWh)
1	6	00:00-09:00	5.6
2	2	09:00-12:00	2.6
3	2	12:00-14:00	1.9
4	2	14:00-16:00	0.85
5	2	16:00-18:00	0.7
6	2	18:00-20:00	2.1
7	2	20:00-22:00	2.3
8	2	22:00-24:00	1.4

Industrial Monthly EB bill Reading

SI.NO	Date	Readings (units)
1	24/11/2021	3186
2	22/10/2021	1890
3	27/09/2021	3568

Code using matlab for load curve calculation

```matlab
clc;
clear all;
close all;
data=[0 6 40; 6 10 50; 10 12 60; 12 16 50; 16 20 70; 20 24 40]
st=data(:,1);
et=data(:,2);
load_m =data(:,3);
load =load_m*10^3;%load in kw
time=et-st; %time in hours
units_gen=sum(time.*load)% units generated kwh
L=length(data);
Time_interval=data(:,1:2);
t=sort(reshape(Time_interval,1,2*L));
for n=1:L
p(2*n-1)=load_m(n);
p(2*n)=load_m(n);
end
plot(t,p)
xlabel(['time in hours'])
ylabel(['power,MW'])
axis([0 24 0 100])
title('Daily load curve')
display('Two part tariff calculation')
Fixed_charge=input('enter cost of fixed charge:100');
Running_charge=input('enter cost of running charge:0.1');
units_gen_monthly=units_gen*30;
bill=(Fixed_charge*max(load)+Running_charge*units_gen_monthly)
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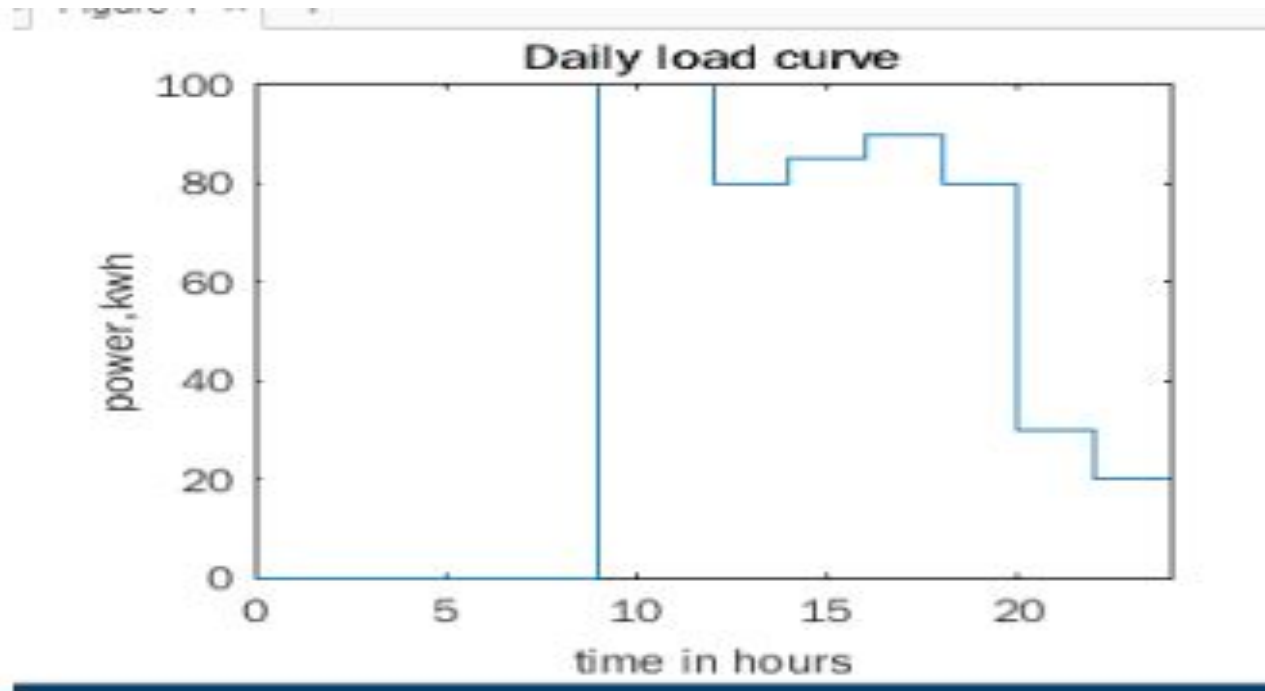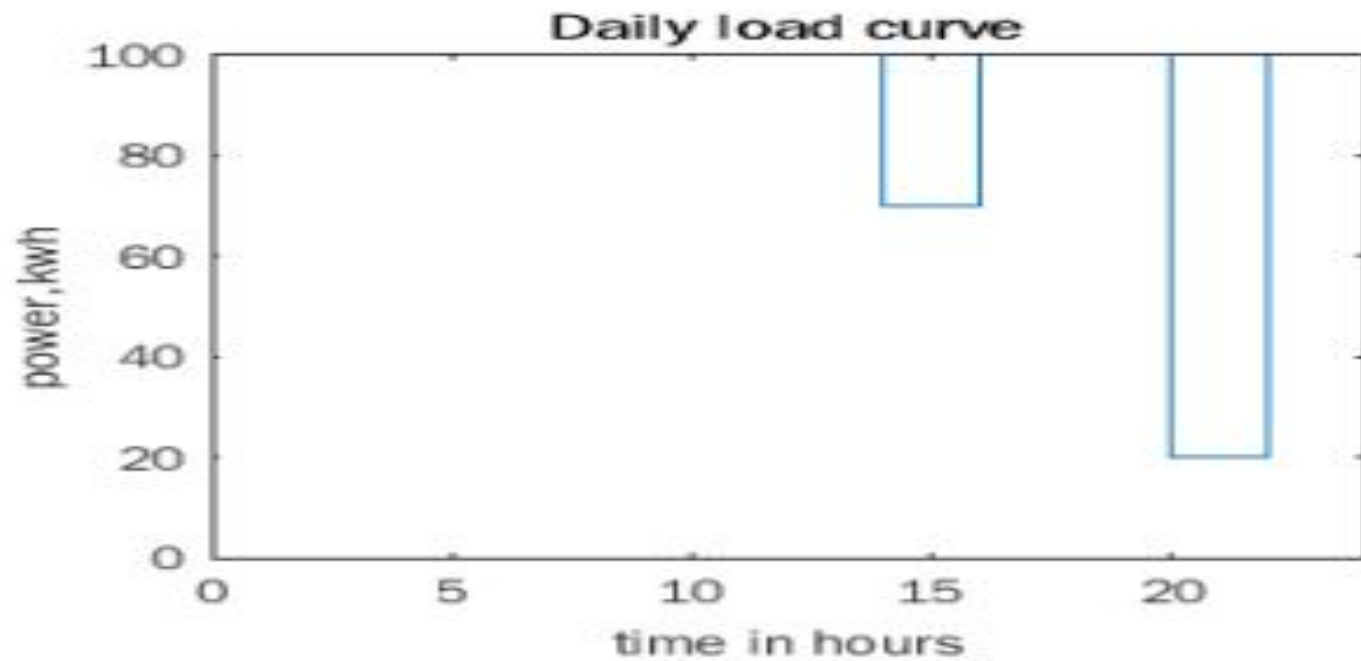# Analytical solution using matlab - Domestic
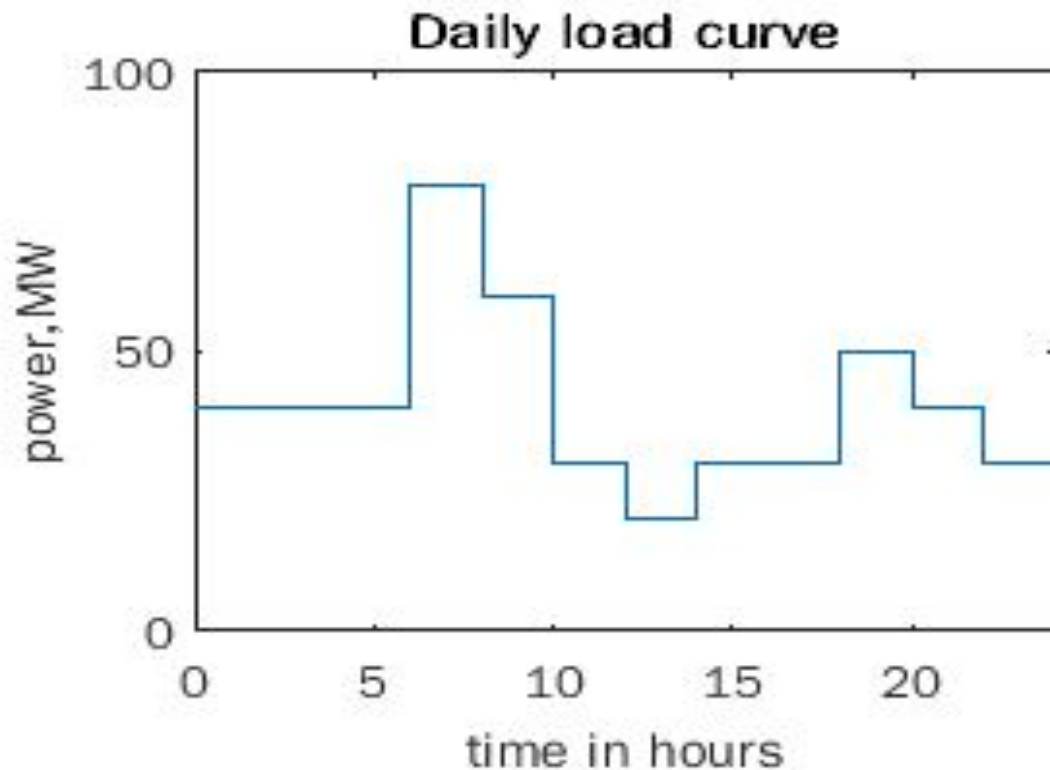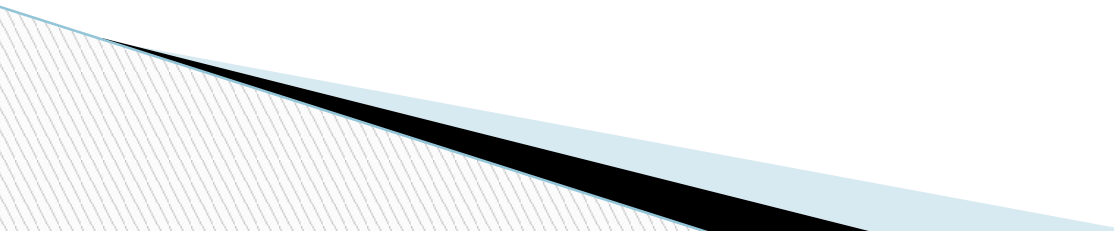
matlab - Commercial

Figure 2 Complex tariffs Matlab – vahini complex sivakasi.
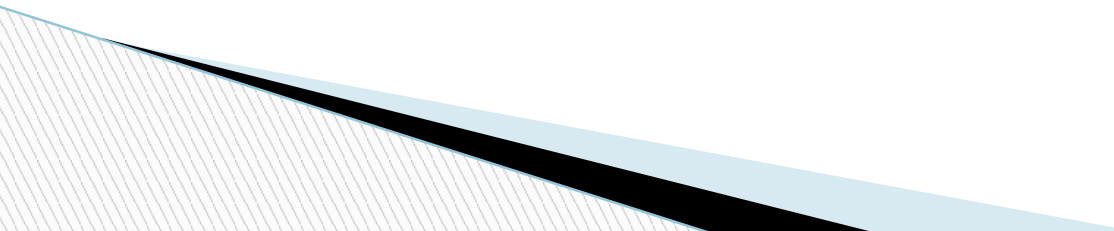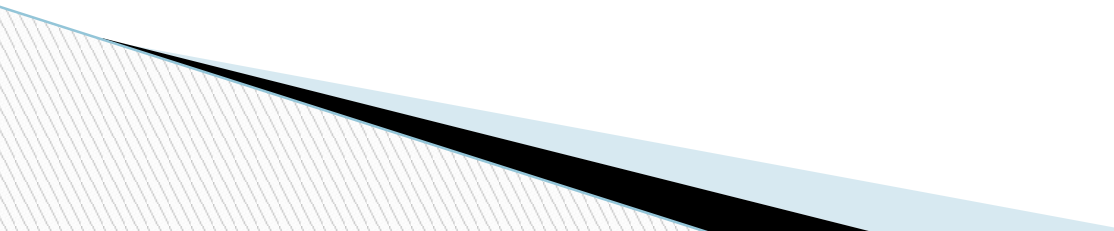
matlab - industrial

Result

Readings are taken from the monsoon- winter season. It will be useful for creating awareness for the consumers how much electricity they are consuming in a day

- For Domestic tariffs per day = 4.1 kWh
- For Complex tariffs per day = 5.05 kWh
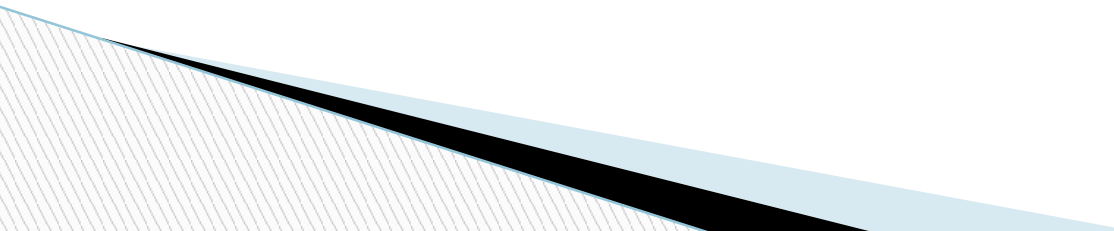- For Industrial tariffs per day= 18.6 kWh

Conclusion

- This conference depicts the real time analysis of Daily load curve on different tariffs using matlab.

- Load curve is being a major tool for graphical representation of variation between electrical loads versus time.

- The research or the further study on new methodologies, load curve, tariff is on the way however it needs broad efforts and trans-disciplinary cooperation of engineers, economists.

Future Scope

- In future, we try to do load duration curve analysis.

- The main purpose is to illustrate the relationship between generating electricity in requirement and utilization.

Referencs

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[2] Kajal gaur, Harish kumar Rathour, P.K.Agarwal, K.V.S Baba, and S.K. Soonee, "Analysing the electricity demand pattern", 2016

[3] Ferdinando Salata, Andrea de lieto vollaro and Roberto de leito vollaro, "A case study of technical nad economic comparison among energy production systems in a complex of historic buildings in Rome ", 68th conference of the italian theraml machines enginering association , energy procedia 45(2014) pp 482-491

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[5] Issac kofi nti, Moses Teimeh, Owusu nyarko boatteng and adebayo felix adekoya, "Electricity load forecasting: a systematic review" , journal of electrical systems and information technology, 2020, pp7:13

[6] Nissanaga nishad rasanjan mendis and nisal perera, "Energy audit: a case study", IEEE, ICSTA 2006.

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[9] Mhaske Somanath, jagtap swapnil and jhadav vikas, "Enegry audit; A case study of an engineering building", intertnational journal of engineeing reasearch and technology, ISSN: 2278 – 0181, Vol 8, Issue 05, may 2019

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Thank you