REE086 POWER THEFT AND ENERGY MANAGEMENT L T P: 3 0 0 3 Credit

UNIT-I: Introduction:

Energy sources, Energy demand and supply, Energy crisis, Future Scenario, Menace of power theft, reasons

for power pilferage, electricity loss and theft-National and Global Scenario, Security seals and tampering,

harmonics and power theft, Control Over power theft.

UNIT-II: Power Theft in Electro-mechanical Meters:

Power theft in voltage circuit, by-passing meters, drilling holes on Electro-mechanical Meters, Insertion of film into meter, partial earth faults tampering, Missing Neutral Method.

Power Theft in Electronic Meters: Power theft by means of Electrostatic Discharge, Power theft by

tampering printed circuit board, Power theft by tampering the frequency circuit, tampering on display circuits of energy meter, Introducing limit switch.

UNIT-III:

Energy system efficiency, Energy conservation aspects, Instrumentation and measurements.

Principles of Energy Management and Energy Audit:

General principles, Planning and program, Introduction to energy audit, General methodology, Site surveys,

Energy systems survey, Energy audit, Instrumentation, Analysis of data and results.

UNIT-IV: Electrical Load and Lighting Management:

General Principles, Illumination and human comfort, Lighting systems, Equipment’s, Electrical systems,

Electrical load analysis, Peak load controls.

Demand Side Management:Concept and Scope of Demand Side Management, Evolution of Demand Side

Management. DSM Strategy, Planning, Implementation and its application, Customer Acceptance & its

implementation issues, National and International Experiences with DSM.

Text Books:

1. G.Sreenivasan, “Power Theft”, PHI Learning Private Limited

2. AmlanChakrabarti, “Energy Engineering and Management”, PHI Learning Private Limite

SUB. POWER THEFT AND ENERGY MANAGEMENT PAPER CODE: REE086

 SEMESTER:- VIII SESSSION 2019-2020 BRANCH ; EE/EN

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| LECTURE NO. | TOPIC | DATE OF COMLETION |
|  | Introduction, Energy sources |  |
|  | Energy demand and supply, Energy crisis , Future Scenario |  |
|  |  Menace of power theft, reasons for power pilferage |  |
|  | Electricity loss and theft-National and Global Scenario, Security seals and tampering, |  |
|  | Harmonics and power theft, Control Over power theft |  |
|  | Power Theft in Electro-mechanical Meters: Power theft in voltage circuit, by-passing meters |  |
|  | Drilling holes on Electro-mechanical Meters, Insertion of film into meter |  |
|  | Partial earth faults tampering, Missing Neutral Method. |  |
|  | Power Theft in Electronic Meters: Power theft by means of Electrostatic Discharge, |  |
|  | Power theft by tampering printed circuit board, Power theft by tampering the frequency circuit, |  |
|  | Tampering on display circuits of energy meter, Introducing limit switch. |  |
|  | Energy system efficiency, Energy conservation aspects, |  |
|  | Instrumentation and measurements. |  |
|  | Principles of Energy Management and Energy Audit: |  |
|  | General principles, Planning and program, |  |
|  | Introduction to energy audit, General methodology, Site surveys, Energy systems survey, |  |
|  | Energy audit, Instrumentation, Analysis of data and results. |  |
|  | Electrical Load and Lighting Management: |  |
|  | General Principles, Illumination and human comfort |  |
|  | Lighting systems, Equipment’s |  |
|  | Electrical systems, Electrical load analysis |  |
|  | Peak load controls |  |
|  | Concept and Scope of Demand Side Management |  |
|  | Evolution of Demand Side Management |  |
|  | DSM Strategy, Planning, Implementation and its application, |  |
|  | Customer Acceptance & its implementation issues, |  |
|  | National and International Experiences with DSM. |  |

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| --- | --- | --- |
| CO-1 | Knowledge of energy source, demand, supply, crisis and future scenario. Understanding of power theft, pilferage, losses national and international scenario. Understanding of security sealing, tampering, harmonics and control over power theft. | K1,K2,K3,K4 |
| CO-2 | Understanding concept of power theft in circuits, apply instruments for measurement. Understanding methods for tampering and effects of neutral missing.. Understanding methods for tampering in electronics meter. | K-2,,K-3 |
| CO-3 | Understanding of avoidable losses in energy system, conservation of energy, apply instruments for audit, understanding of energy planning and program for energy audit and survey of energy consumption system and analyzing of data collected. | K-2, K-3, K-4 |
| CO-4 | Understanding the level of illumination of area, comfort of human, equipments of lighting system, loads analysis and control of peak loads. Understanding of DSM, its scope, evolution, strategy, planning, implementation and application. Create customer acceptance and implementation issues. Analysis of national and international experiences with DSM. | K-2, K-4,K6 |

K1 – Remember K2 – Understand K3 – Apply K4 – Analyze K5 – Evaluate K6 – Create

Q.1 Answer all five.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | List different source of energy. |  | 1 |  |
| B | What is power theft or pilferage? |  | 1 |  |
| C | What are sealing and tampering in power system? |  | 1 |  |
| D | What is harmonics and how it affect the power losses |  | 1 |  |
| E | List types of power meters. |  | 1 |  |

Q2. Answer any two.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | Explain energy demand, supply, crisis ad future scenario |  | 5 |  |
| B | Explain Menace of power theft and reason of power pilferage. |  | 5 |  |
| C | What are methods power thieves used in electromagnetic metering. |  | 5 |  |
| D | What are methods power thieves used in electronic metering. |  | 5 |  |

Q3. Answer any one

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | Explain electricity loss and theft-National and Global Scenario.  |  | 5 |  |
| B | How to control the power theft |  | 5 |  |

Q4. Answer any one

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | Explain the Power theft in voltage circuit and by-passing meters with diagram.  |  | 5 |  |
| B | Explain Power theft by means of Electrostatic Discharge in electronic meters |  |  |  |

Q.5 Answer any one

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | Explain power theft by drilling holes and insertion of film on E-M meters. |  | 5 |  |
| B | Explain Power theft by tampering the frequency circuit. |  | 5 |  |

Energy is life, without energy the modern lifestyle or even to survive an ordinary lifestyle cannot be imagined. So energy is very vital for the existence of human being. Oil is one of the conventional age old energy sources which are finite. The total oil stock of the planet is been estimated to linger 65 years more.There will be some time less than a century where there will be no oil at all. There are certain scientific operations and activities for which oil is essential. Renewable energy cannot replace oil in these scientific operations.

For the first 7 months in the current financial year, the petrol and diesel consumption in India posed a growth of 9.2% and 5% respectively. This shows that our demand for oil is growing on a daily basis. The population is increasing, our living standards is improving, average human expectations are rising, so in such a situation we are aspiring for more comfortable lifestyle for which energy is very vital.

Renewable Energy

Renewable energy is more preferred these days because of no carbon emission and no Green house gases. Government has taken a pledge to reduce 10% of oil imports by 2022 and India being oil deficient country, the conservation becomes very vital. This is not very ambitious target and 10% reduction is feasible. Whatever we require for our sustenance and for meaningful objective is welcome, but wasting oil cannot be tolerated. It pinches in financial terms and also affects our future generation.

India also committed at international level its renewable energy target of having 175 GW capacity by 2022, which includes 100 GW Solar, 60 GW Wind, 10 GW Biomass and 5 GW Small Hydro.Renewable energy in such a big way along with massive nuclear plants can help reduce 10% of oil imports by 2022.

Electric Vehicles

The government is aspiring to move towards electric vehicles where it wants only electric vehiclesto run on its roads by 2030. Many say it is futuristic, but it is not. The charging points, battery components need to be in place. When the source of the electricity is from fossil fuels, then electric vehicles will also generate green house gases.

Oil Conservation

Oil conservation week is celebrated every year, from 4thof January to the 10th of January, by the people worldwide in order to increase the awareness all across the world regarding the importance of conservation of the petroleum products. Since oil is a finite resource, it needs to be conserved on a finite basis. In traffic signals when the signal is red, the vehicles need to be switched off, so that unnecessary wastage of fuel can be avoided. In cooking, heat is to be conserved and recycled. In industrial processes, the heat can be recycled and so energy can be recycled. A lot of capacity building, training, and tree plantation at local level are required because if people are not able to conserve energy, no one can conserve it as government alone cannot do everything. People in their own interest for their own existence need to protect the planet.

Clean energy measures like ethanol blending or bio fuel mixing are very vital. Oil from bio fuel sources are environmental friendly and don’t create more emissions.

Energy conserved means energy generated. By conserving energy we will be saving the precious resources for the future generation and it will be beneficial on the financial front also. India must aim for less oil dependence and depend more on clean and renewable energy.

All over India Petrol Consumption is 26000000 Metric Tonnes/annul i.e. 35360000 kiloliters i.e. 35360000000 liters.

India’s Population is 1320000000 i.e per person consumption of petrol is 26.78 lit/person/annum

All over India Diesel Consumption is 82000000 Metric Tonnes/annum i.e. 98400000 kiloliters i.e. 98400000000 liters.

India’s Population is 1320000000 i.e per person consumption of Diesel is 74.54 lit/person/annum