



SNS COLLEGE OF ENGINEERING
(Autonomous)
DEPARTMENT OF CSE - IoT



COURSE NAME:19OE701 / SUSTAINABLE ENERGY FOR SMART CITIES
IV YEAR/VII SEMESTER

UNIT:1- CLASSIFICATION OF ENERGY

TOPIC:INTRODUCTION TO SOLAR ENERGY



Introduction

Solar energy is a renewable and sustainable form of energy derived from the sun's radiation. It is a powerful and abundant source of energy that holds immense potential for addressing our global energy needs while reducing environmental impacts. By capturing and converting sunlight into usable forms of power, solar energy offers a clean and viable alternative to traditional fossil fuels. This introduction provides an overview of the key concepts and benefits of solar energy:

Sunlight as a Resource: The sun emits an enormous amount of energy in the form of sunlight. This energy travels through space and reaches the Earth, where it can be harnessed and converted into electricity or heat. Solar energy technologies aim to capture this abundant resource and convert it into useful energy for various applications.



Contd....

Photovoltaic (PV) Technology: One of the primary methods of harnessing solar energy is through photovoltaic (PV) technology. Photovoltaic cells, commonly known as solar cells, are designed to absorb sunlight and generate electricity directly through the photovoltaic effect. When sunlight strikes these cells, it excites electrons within the material, creating an electric current that can be used to power homes, businesses, and devices.

Solar Thermal Technology: Solar thermal technology focuses on capturing sunlight to produce heat, which can then be used for space heating, water heating, and industrial processes. This is achieved through solar collectors that absorb sunlight and transfer the heat to a fluid, which is then used to generate steam or hot water for various applications.



Benefits of Solar energy

Renewable and Abundant: The sun is an inexhaustible source of energy, ensuring a virtually unlimited supply.

Environmentally Friendly: Solar energy produces no greenhouse gas emissions, contributing to reduced air pollution and mitigating climate change.

Reduced Energy Costs: Once solar systems are installed, they have minimal operating and maintenance costs, leading to long-term savings on electricity bills.

Energy Independence: Solar energy reduces dependence on imported fossil fuels, enhancing energy security.

Job Creation: The growing solar industry creates jobs in manufacturing, installation, maintenance, and research.

Scalability: Solar energy systems can be tailored to various scales, from small residential installations to large utility-scale power plants.



Challenges and Considerations



Intermittency: Solar power generation is dependent on sunlight availability, which varies based on location, weather, and time of day.

Initial Costs: The upfront costs of installing solar systems, including solar panels and associated equipment, can be a barrier for some individuals and organizations.

Energy Storage: To address intermittency, energy storage solutions like batteries are often needed to store excess energy for use during cloudy periods or at night.



*Thank
you*