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Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 7	Chapter 8	Chapter 9	Chapter 10
Introduction to Renewable Energy	Solar Energy	Wind Energy	Hydro Energy	Geothermal Energy	Biomass Energy	Tidal Energy	Wave Energy	Hydrogen Energy	Energy Storage

	Best Solution	Minimum Value	Maximum Value
PERFORMANCE DATA			
PES	%	26.0	0.0
CAR Prize	€/MWh	26.52	0.00
Gross El. Energy Production	MWh.y	33'695	21'079
Th. Energy Request	MWh.y	93'015	0
Th. Energy by biomass	MWh.y	70'362	0
Th. Energy by Gas - Stops	MWh.y	3'957	0
Th. Energy by Gas - Integr.	MWh.y	18'696	0
Biomass Consumption	ton	57'403	53'407
Gas Consumption	m3	2'520'390	0
INVESTMENTS COSTS			
Steam Turbine	€	3'200'000	2'100'000
DH Network	€	2'231'943	0
Gas Boilers	€	200'000	200'000
Absorption Machines	€	720'000	0
OPERATING COSTS			
Biomass cost	€/y	2'728'014	2'167'174
Natural Gas cost	€/y	1'008'156	0
REVENUES			
Thermal energy revenue	€/y	6'095'156	0
Electric Energy revenue	€/y	5'820'052	3'629'578

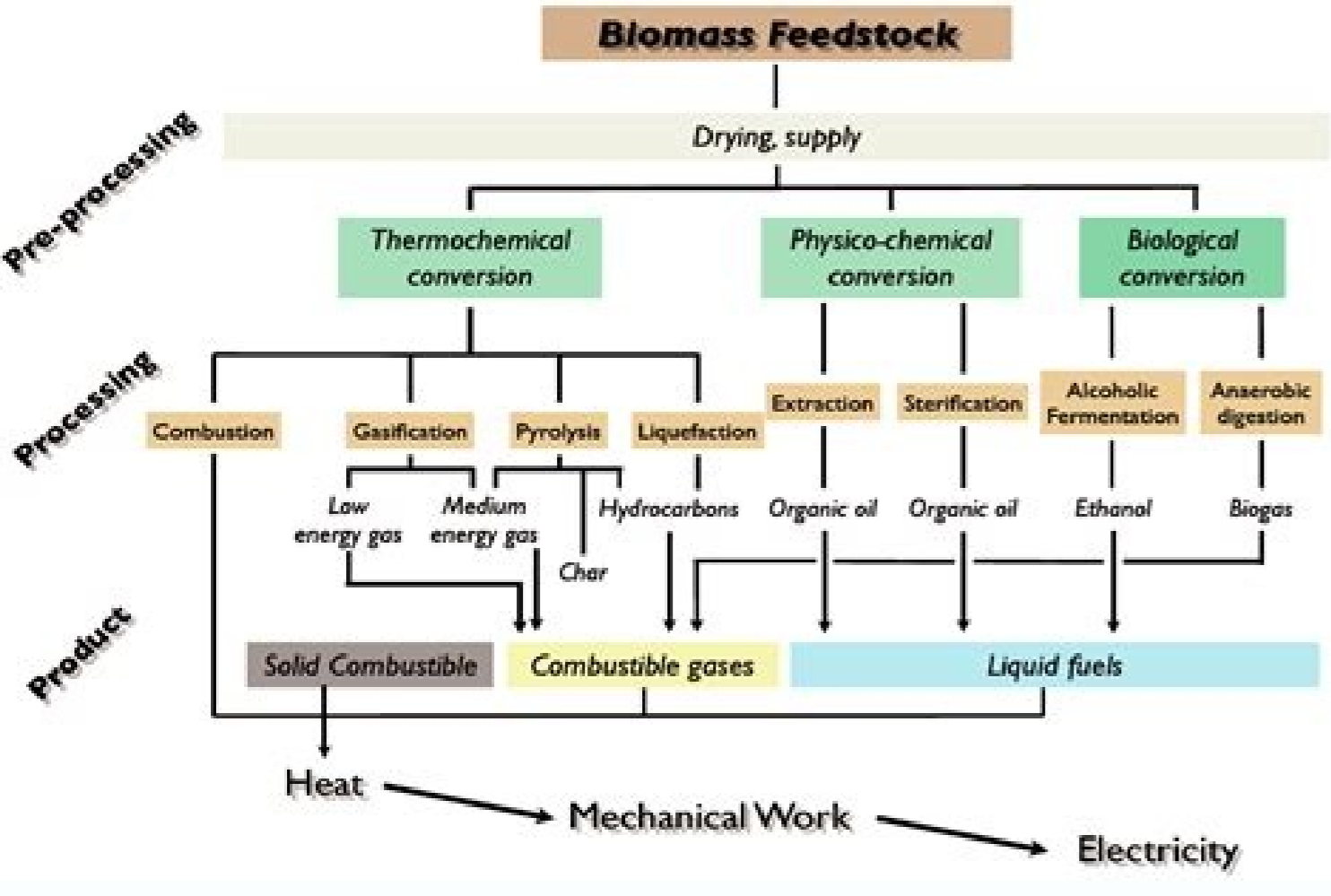


Figure 5: Routes for the conversion of biomass.

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• To discuss causes of energy scarcity and its solution, energy resources and availability of renewable energy. • To explain sun - earth geometric relationship, Earth - Sun Angles and their Relationships. • To discuss about solar energy reaching the Earth's surface and solar thermal energy applications. • To discuss types of solar collectors, their configurations and their applications. • To explain the components of a solar cell system, equivalent circuit of a solar cell, its characteristics and applications. • To discuss benefits of hydrogen energy, production of hydrogen energy, storage its advantages and disadvantages. • To discuss wind turbines, wind resources, site selection for wind turbine. • To discuss geothermal systems, their classification and geothermal based electric power generation. • To discuss waste recovery management systems, advantages and disadvantages. • To discuss biomass production, types of biomass gasifiers, properties of producer gas. • To discuss biogas, its composition, production, benefits. • To discuss tidal energy resources, energy availability, power generation. • To explain motion in the sea wave, power associated with sea wave and energy availability and the devices for harnessing wave energy. Module-1 Introduction: Causes of Energy Scarcity, Solution to Energy Scarcity, Factors Affecting Energy Resource Development, Energy Resources and Classification, Renewable Energy - Worldwide Renewable Energy Availability, Renewable Energy in India. Energy from Sun: Sun- earth Geometric Relationship, Layer of the Sun, Earth - Sun Angles and their Relationships, Solar Energy Reaching the Earth's Surface, Solar Thermal Energy Applications. Solar Thermal Energy Collectors: Types of Solar Collectors, Configurations of Certain Practical Solar Thermal Collectors, Material Aspects of Solar Collectors, Concentrating Collectors, Parabolic Dish - Stirling Engine System, Working of Stirling or Brayton Heat Engine, Solar Collector Systems into Building Services, Solar Water Heating Systems, Passive Solar Water Heating Systems, Applications of Solar Water Heating Systems, Active Solar Space Cooling, Solar Air Heating, Solar Dryers, Crop Drying, Space Cooling, Solar Cookers, Solar pond, Solar Cells: Components of Solar Cell System, Elements of Silicon Solar Cell, Solar Cell materials, Practical Solar Cells, I - V Characteristics of Solar Cells, Efficiency of Solar Cells, Photovoltaic panels (series and parallel arrays). Hydrogen Energy: Benefits of Hydrogen Energy, Hydrogen Production Technologies, Hydrogen Energy Storage, Use of Hydrogen Energy, Advantages and Disadvantages of Hydrogen Energy, Wind Energy: Windmills, Wind Turbines, Wind Resources, Wind Turbine Site Selection. Geothermal Energy: Geothermal Systems, Classifications, Geothermal Resource Utilization, Resource Exploration, Geothermal Based Electric Power Generation, Associated Problems, environmental Effects. Solid waste and Agricultural Refuse: Waste is Wealth, Key Issues, Waste Recovery Management Scheme, Advantages and Disadvantages of Waste Recycling, Sources and Types of Waste, Recycling of Plastics. Click here to download Module-3 Module-4 Biomass Energy: Biomass Production, Energy Plantation, Biomass Gasification, Theory of Gasification, Gasifier and their Classifications, Chemistry of Reaction Process in Gasification, Updraft, Downdraft and Cross-draft Gasifiers, Fluidized Bed Gasification, Use of Biomass Gasifier, Gasifier Biomass Feed Characteristics, Applications of Biomass Gasifier, Cooling and Cleaning of Gasifiers. Biogas Energy: Introduction, Biogas and its Composition, Anaerobic Digestion, Biogas Production, Benefits of Biogas, Factors Affecting the Selection of a Particular Model of a Biogas Plant, Biogas Plant Feeds and their Characteristics. Tidal Energy: Introduction, Tidal Energy Resource, Tidal Energy Availability, Tidal Power Generation in India, Leading Country in Tidal Power Plant Installation, Energy Availability in Tides, Tidal Power Basin, Turbines for Tidal Power, Advantages and Disadvantages of Tidal Power, Problems Faced in Exploiting Tidal Energy. Click here to download Module-4 Module-5 Sea Wave Energy: Introduction, Motion in the sea Waves, Power Associated with Sea Waves, Wave Energy Availability, Devices for Harnessing Wave Energy, Advantages and Disadvantages of Wave Power. Ocean Thermal Energy: Introduction, Principles of Ocean Thermal Energy Conversion (OTEC), Ocean Thermal Energy Conversion plants, Basic Rankine Cycle and its Working, Closed Cycle, Open Cycle and Hybrid Cycle, Carnot Cycle, Application of OTEC in Addition to Produce Electricity, Advantages, Disadvantages and Benefits of OTEC. At the end of the course the student will be able to: • Discuss causes of energy scarcity and its solution, energy resources and availability of renewable energy. • Outline energy from sun, energy reaching the Earth's surface and solar thermal energy applications. • Discuss types of solar collectors, their configurations, solar cell system, its characteristics and their applications. • Explain generation of energy from hydrogen, wind, geothermal system, solid waste and agricultural refuse. • Discuss production of energy from biomass, biogas. • Summarize tidal energy resources, sea wave energy and ocean thermal energy. The question paper will have ten full questions carrying equal marks. Each full question will be for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module. Each full question will have sub- question covering all the topics under a module. The students will have to answer five full questions, selecting one full question from each module. 1 Nonconventional Energy Resources Shobh Nath Singh Pearson 1st Edition, 2015 Nonconventional Energy Resources B.H. Khan McGraw Hill 3rd Edition 2 Renewable Energy: Power for a sustainable Future Godfrey Boyle Oxford 3rd Edition, 2012 3 Renewable Energy Sources: Their Impact on global Warming and Pollution Tasneem Abbasi S.A. Abbasi PHI 1st Edition, 2011 4 VTU Biomass Energy System Notes I want the notes/ syllabus of Biomass Energy Systems of B.Tech Mechanical Engineering 8th semester of VTU so can you provide me? Ok, here I am providing you the syllabus of Biomass Energy Systems of B.Tech Mechanical Engineering 8th semester of VTU. VTU B.Tech ME 8th semester Biomass Energy Systems syllabus Unit-1 Introduction 6 hours Biomass energy sources, energy content of various Bio - fuels, Energy plantation, origin of Biomass photo synthesis process, Biomass Characteristics, sustainability of Biomass. Unit-2 Biomass Conversion Methods 6 hours Agrochemical, Thermochemical, Biochemical (flowchart) & Explanation. Unit-3 Physical & Agrochemical Conversion 7 hours Briquetting, Pelletization, Agrochemical, fuel Extraction, Thermo chemical Conversion: Direct combustion for heat, Domestic cooking & heating. Unit-4 Biomass Gasification 7 hours Chemical reaction in gasification, Producer gas & the constituents, Types of gasifiers. Fixed bed gasifiers, Fluidized bed gasifiers. Liquefaction: Liquefaction through pyrolysis & Methanol synthesis, application of producer gas in I C Engines. Part B Unit-5 Bio-Methanization 6 hours Anaerobic digestion, Basic principles, factors influencing Biogas yield, classification of Biogas digester, floating gas holder & fixed dome type. (Working Principle with diagram). Calculations for sizing the Biogas plant. Unit-6 Biogas For Power Generation 6 hours Ethanol as an automobile fuel, Ethanol production & its use in engines. Unit-7 Bio - Diesel 7 hours Bio Diesel from edible & non-edible oils, Production of Bio diesel from Honge & Jatropha seeds, use of bio diesel in I C engines, Engine power using Bio diesel, Blending of Bio diesel, Performance analysis of diesel engines using bio diesel, Effect of use of bio diesel in I C engines. Unit-8 Bio Power Plants 7 hours Bio Power generation routes, Basic Thermodynamic cycles in Bio power generation: Brayton cycle, Stirling cycle, Rankine cycle, Co-generation cycle, Biomass based steam power plant. Contact- Visvesvaraya Technological University Karnataka Jnana Sangama, VTU Main Road, Machhe Belagavi, Karnataka 590018 Last edited by Neelurk; February 13th, 2020 at 09:41 AM. 18EE653 Renewable Energy Sources CBCS Notes Here you can download the VTU CBCS 2018 Scheme notes, and Study materials of 18EE653 Renewable Energy Sources of the Electrical and Electronics Engineering department. University Name: Visvesvaraya Technological University (VTU), Belagavi Branch Name: Electrical and Electronics Engineering - EEE Semester: 6th Sem (3rd Year BE) Subject Code and Subject Name: 18EE653 Renewable Energy Sources Notes Scheme of Examination: 2018 Scheme Marks Distribution: 40 Marks for Continuous Internal Assessment and 60 Marks for Semester end examination Important Concepts discussed: Introduction to Renewable Energy Sources. Energy from Sun. Solar Thermal Energy Collectors and Solar Cells. Hydrogen Energy, Wind Energy, and Geothermal Energy. Solid waste and Agricultural Refuse. Biomass Energy, Biogas Energy, and Tidal Energy. Sea Wave Energy and Ocean Thermal Energy. Click the below link to download the 2018 Scheme VTU CBCS Notes of 18EE653 Renewable Energy Sources M-1, M-2, M-3, M-4, and M-5 See also 18EE744 Smart Grid VTU CBCS Notes Follow the link to download the 2017 and 2015 Scheme VTU CBCS Notes Click the below link to download the CBCS 2018 Scheme 6th Semester VTU Question Papers EEE VTU Question Papers Summary Here you can download the 2018 scheme VTU CBCS Notes of Renewable Energy Sources of the EEE department. If you like the material share it with your friends. Like the Facebook page for regular updates and YouTube channel for video tutorials. By Digbijay Patil ViewsType: PYQ Rating: 08th Semester - 2011 VTU Previous Year Questions of Bio-mass Energy System - BMES of Visveswaraiah Technological University - VTU, B.Tech, MECH, 2010, 8th Semester Course: B.Tech / BE Group: Big Data/biomass energy systems biomass energy systems vtu notes biomass energy systems vtu notes pdf biomass energy systems vtu question papers biomass energy engineering biomass energy systems notes biomass energy systems video lecture biomass energy systems lecture notes biomass energy systems btech notes biomass energy systems pdf download biomass energy systems classes biomass energy systems question banks biomass energy systems solved papers" - Bio-mass Energy System, BMES Previous year questions © Copyright 2022. All Rights Reserved.

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