

Applying Renewable Energy

Online programme overview

COURSE OVERVIEW & ENROLLMENT INFORMATION

INTRODUCTION

Applying Renewable Energy provides fundamental knowledge on the most widely used renewable energy technologies. No previous knowledge of electricity or renewable energy is required.



THIS PROGRAM IS SUITABLE FOR THOSE WHO:

- Need an overview of technologies for private or professional purposes
- Would like to refresh technical knowledge before further training
- Want to make the first step towards implementing RE projects

LEARNING OBJECTIVES

- Assess resources and suitability of sites for each technology
- Decide which components are to be used for which purpose (e.g. off-grid)
- Roughly calculate system size and energy yield and determine crucial parameters
- Explain the principle functioning and physics of each technology

SCHEDULE & ORGANISATION

STARTING DATES	Spring I Fall semester each year Start date: 1 April / 1 October
RECOMMENDED STUDY TIME	• 60 -100 hours total Duration will vary depending on specialization • 5 - 10 hours study time per week • 2-3 Live webinars • 3 Assignments
FEES	€ 425 - € 700 Pricing will vary depending on specialization Payment methods: VISA, MasterCard, American Express, PayPal, Invoice
DISCOUNTS	Early Bird 10%, Alumni 10%, Group 5% (min. 2 people)
REGISTRATION	You can register online: Shop - RENAC

DEADLINES

Early bird deadline:
20 August / 20 February

Registration deadline:
30 September / 31 March

APPLYING RENEWABLE ENERGY ONLINE COURSES



Each “Applying Renewable Energy” online training comprises a combination of 3, 4 or 7 courses on the most widely used renewable energy technologies.

Optional courses on grid integration and financial aspects of renewable energy are available to all participants (not part of the exam/certificate).

COURSE COMBINATIONS

Participants can choose between five different online trainings, which each present a selection of renewable energy technologies.

Market Leaders

This training introduces the technologies with the biggest shares in the renewable energy world markets.

- **Technologies:** PV, Biogas, Wind
- **Fee:** € 425 (German VAT 19% may apply)
- **Duration:** 6 months
- **Study time:** approx. 60 hours

Solar Thermal Technologies

This training presents different solar technologies used for hot water provision or electricity production.

- **Technologies:** PV, ST, CSP, PV-diesel
- **Fee:** € 525 (German VAT 19% may apply)
- **Duration:** 6 months
- **Study time:** approx. 70 hours

Complete Overview

This training covers all seven technologies and helps to understand the big picture of renewable energy.

- **Technologies:** PV, ST, CSP, PV-diesel, Biogas, Wind, Small hydro
- **Fee:** € 700 (German VAT 19% may apply)
- **Duration:** 6 months
- **Study time:** approx. 100 hours

Large-Scale Systems

This training focuses on large-scale grid connected renewable energy systems for electricity production.

- **Technologies:** PV, CSP, Wind
- **Fee:** € 425 (German VAT 19% may apply)
- **Duration:** 6 months
- **Study time:** approx. 60 hours

Small-Scale Systems

This training presents small-scale systems used for the provision of hot water or electricity in households.

- **Technologies:** PV, ST, Biogas, Hydro
- **Fee:** € 525 (German VAT 19% may apply)
- **Duration:** 6 months
- **Study time:** approx. 70 hours

LEARNING OBJECTIVES & CONTENT OF THE COURSES



MAIN COURSES

PV – application

After completion of this course, participants will be able to:

- Describe a range of grid-connected and off-grid PV applications and how they are useful
- Visualise how onsite PV electricity generation can meet daily electricity demand describe solar irradiation around the globe
- Calculate the required spacing between PV module rows to avoid self-shading
- Calculate the basic energy yield from a PV system using Peak Sun Hours and Performance Ratio
- Explain which factors influence the capital and operational expenditures of PV systems, and give examples of system costs in different countries around the world
- Perform basic calculations of payback time and unit cost of electricity for grid-connected and off-grid PV systems

Content

- Grid-connected PV applications
- Off-grid PV applications
- Energy flow and metering options
- Solar irradiation and space requirements
- PV system energy yield
- Economics of PV systems

PV-diesel hybrid systems

After completion of this course, participants will be able to:

- Estimate the potential and suitable locations for PV-diesel hybrid systems
- Decide which components are to be used for which purpose
- Explain the basic parameters for system sizing and dynamic system behaviour
- Evaluate PV-diesel hybrid systems from an economic perspective

Content

- System components
- System sizing
- Dynamic system behaviour
- Economic evaluation
- Case studies

LEARNING OBJECTIVES & CONTENT OF THE COURSES



MAIN COURSES

Wind power - application and cost development

After completion of this course, participants will be able to:

- Distinguish the different applications of wind turbines and name the turbine components
- Identify economic and environmental aspects of wind power

Content

- Wind power applications
- Introduction of wind turbine components
- Wind turbine power output
- Wind farms and protection of the environment
- Repowering and decommissioning
- CAPEX, OPEX and LCOE of wind power

Small Hydropower

After completion of this course, participants will be able to:

- Distinguish different types of hydropower plants and their main components
- Calculate the power from a flow of water and describe different methods of measuring flow rate and head
- Explain the civil and electro-mechanical engineering system design
- Present specific costs as well as a cost breakdown of a sample scheme

Content

- Different types of hydro plant
- Resource assessment
- Civil engineering components
- Electro-mechanical equipment
- Costs

Concentrated solar power

After completion of this course, participants will be able to:

- Explain the functioning and global potential of concentrated solar power (CSP) plants
- Distinguish the different CSP technologies including their functionality, current state of the technology and advantages / disadvantages
- Describe various components of CSP plants
- Present CSP costs and cost trends

Content

- Market
- CSP Technologies
- Other components of CSP plants
- Comparison of CSP technologies
- The future of CSP

LEARNING OBJECTIVES & CONTENT OF THE COURSES



MAIN COURSES

Biogas - application

After completion of this course, participants will be able to:

- Describe the range of applications for biogas systems
- Explain the relevance of biogas in the energy mix
- Classify the most common types of biogas systems and their components, purpose, and output
- Explain a biogas plant's role in transforming organic waste into organic fertiliser
- Describe all the logistics required to provide the needed substrates for a biogas system
- Analyse the impact of different input parameters on the power output of biogas systems
- Evaluate biogas systems based on economic and environmental aspects

Content

- Biogas application
- Biogas production
- Biogas plant output
- Biogas system classification
- Economic and environmental aspects

Solar thermal

After completion of this course, participants will be able to:

- Present the relevance of solar thermal in the energy mix and its basic economics
- Explain how solar thermal systems and their system components work
- Differentiate types of solar thermal systems and solar thermal collectors
- Describe basics of system sizing, installation, commissioning, operation and maintenance

Content

- Fundamentals of solar thermal energy
- How solar thermal works
- Solar thermal collectors
- System types
- Solar thermal system components
- Practical considerations and economics

LEARNING OBJECTIVES & CONTENT OF THE COURSES



OPTIONAL INTRODUCTORY COURSES

Introduction to electricity

After completion of this course, participants will be able to:

- Describe the basic technological terms and principles governing the operation of electrical power systems
- Give reasons for keeping grid frequency stable
- Explain why power systems are typically built as three-phase AC systems
- Distinguish between electric energy and electric power

Content

- Electricity fundamentals
- Electric energy and electric power

Introduction to the solar resource

After completion of this course, participants will be able to:

- Describe the variability of the solar resource around the world and influencing factors
- Explain the difference between irradiation and irradiance and explain components of solar radiation
- Define important solar terms and the position of the sun in the sky
- Discover the importance of orientation and tilt of a solar array for optimising energy yield

Content

- Introduction to solar energy
- Physical basics of solar energy
- Sun positioning

LEARNING OBJECTIVES & CONTENT OF THE COURSES



OPTIONAL INTRODUCTORY COURSES

Introduction to electric grids

After completion of this course, participants will be able to:

- Explain the basic technological terms and principles governing the operation of electrical power systems
- Explain the importance of frequency and voltage stability for electric grid operation
- Describe the parameters that affect frequency and voltage stability in electric power grids
- Distinguish impacts that conventional power plants and RE power plants have on the operation of a power grid

Content

- Structure of electricity grid
- Secure operation of electricity grids
- Example

Introduction to renewable energy projects

After completion of this course, participants will be able to:

- Illustrate the steps and tasks of a project life-cycle of RE projects
- Compare different public and private perspectives onto RE projects
- Assess project attractiveness with standard methods

Content

- Renewable energy projects
- Financial aspects of RE projects
- Non-financial aspects of RE projects

Introduction to energy

After completion of this course, participants will be able to:

- Describe the global situation of energy supply and demand
- Differentiate forms of energy as well as energy and power
- Name fundamental parameters, units and conversion factors related to energy topic

Content

- Development of the energy market
- Physical basics
- Units and conversion

LEARNING METHODS & ONLINE PLATFORM FEATURES



IMPORTANT FEATURES

- Interactive learning platform
- Multilanguage platform
- Forum for participants
- Integrated Glossary
- Feedback questionnaires
- Stream/Download videos
- Live lectures
- Self-quizzes/Online exams
- Certificates

EARN YOUR CERTIFICATE

- Digital Certificate of Completion
(final grade 70% or above)
- Digital Certificate of Attendance
(final grade below 70%)

TECHNICAL REQUIREMENTS

- An e-mail address, which is regularly checked
- A stable internet connection (at least 2 Mbit/s)
- We use Zoom for webinars
- Headset or speakers are required to participate on webinars



Programme certified by ZFU (German Central Office for Distance Learning – official quality standard for distance learning in Germany)

DEMO COURSE

For a first impression of our online platform, have a look at our demo course: [Demo Course](#)

Contact

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