renac
renewables academy

Online Training Programme

Certified Renewable Energy Project Developer

Photovoltaics | Biogas | Solar Thermal | Wind | PV-Diesel Hybrid Systems

CONTENT

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COVER PHOTO CREDIT: Fotolia

DATE: 16/11/2022

PROGRAMME SUMMARY

The energy sector is responsible for the largest amount of anthropogenic greenhouse gas (GHG) emissions, making it a leading cause of global warming. This makes it important for the world to change how it sources its energy, moving away from burning carbon-based fossil fuels to mitigate climate change as much as possible. In practice, this has to involve many more renewable energy projects being brought online, and these require planning, financing and execution.

This online programme covers the most important economic aspects of renewable energy project planning and describes how the most common public policy support mechanisms work. The programme also looks into how banks view the risks related to renewable energy projects, and examines the parameters they use to assess any new project's bankability in order to decide whether they will get on board and finance it. To this end, the programme includes a checklist for project developers to ensure that potential partner banks receive all the data they require in the way they require it.

The Certified Renewable Energy Project Developer programme offers participants different renewable energy technology specialisations, in photovoltaics (PV), solar thermal, PV-diesel hybrid systems, wind power and biogas. Participants must complete at least **three core courses** and at least **one technology specific project planning elective**.

Additionally, participants have access to five introductory-level general courses as well as a technology-specific foundational course for each chosen elective.

TARGET GROUPS

This programme is suitable for you if:

- you are charged with planning or developing a renewable energy project;
- you need to deal with various stakeholders in a project appraisal process; or
- you will supervise the implementation of a renewable energy system.

Certified by

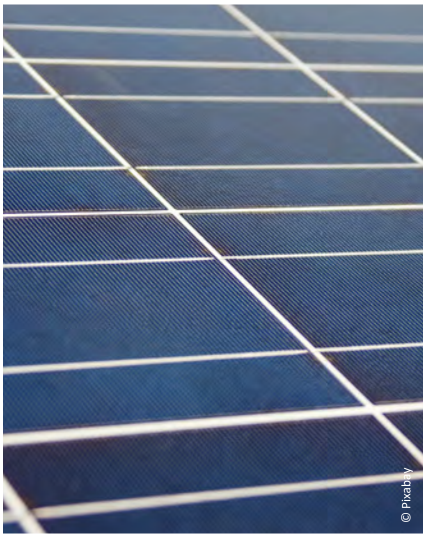
Staatliche Zentralstelle für Fernunterricht zugelassen zfu Nr. 7422622

To successfully complete this programme, participants should have a basic understanding of financial management and business administration and, ideally, some knowledge, experience or interest in renewable energy technologies and project development.

LEARNING OUTCOMES

After completing these courses, participants should be able to:

- calculate the relevant economic parameters of a renewable energy project;
- decide which support mechanisms are best suited to a given RE project;
- prepare the data required for a bankability assessment; and
- define the necessary steps from planning to O&M for a renewable energy system using one or more of the specific technologies offered as specialisations.



PROGRAMME STRUCTURE

INTRODUCTORY COURSES (Optional)

Participants have access to the following introductory courses covering energy and electricity topics. These are not part of the final exam but are meant to provide a conceptual base for participants to build on.

- Introduction to energy
- Introduction to electricity
- Introduction to the solar resource
- Introduction to electric grids
- Introduction to RE projects

CORE COURSES (Mandatory*)

These three courses must be taken by all participants and are covered in the final exam.

- RE feasibility assessment and investment valuation *
- Policy frameworks for RE power generation *
- RE project finance *

ELECTIVE SPECIALISATION COURSES (Optional I Mandatory*)

Participants **must take at least one of the following electives**. Electives contain one mandatory technology-specific planning course and one optional course that covers the technology's applications. The content of the mandatory course is part of the final exam.

PHOTOVOLTAICS

- PV – application
- Planning of large-scale PV grid-connected systems *

BIOGAS

- Biogas – application
- Planning of medium-sized biogas plants *

SOLAR THERMAL

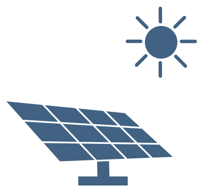
- Solar thermal – application
- Planning of large-scale solar thermal systems *

WIND POWER

- Wind power – application
- Wind power planning and measurement *

PV-DIESEL HYBRID SYSTEMS

- PV – diesel hybrid systems
- Planning of PV-diesel hybrid systems *



SPRING SEMESTER / FALL SEMESTER

Oct/April — March/Sept

Optional courses: Introductory courses

Core courses: RE feasibility assessment and investment valuation → Policy frameworks for RE power generation → RE project finance

Elective courses: PV / Biogas / Solar Thermal / Wind Power / PV-Diesel

Webinar 1 Introduction

Webinar 2 Energy yield of RE

Webinar 3 Financial aspects of RE

Introduction Webinar

INTRODUCTION TO RENAC ONLINE

first week of the semester

(1 hour)

The programme begins with an introductory orientation webinar where participants meet some RENAC staff members who explain how the Moodle platform works and its functions, and introduce the forum. The webinar also covers programme details such as activities and assignments, the exam, deadlines and scheduling. The webinar is not mandatory but participation is strongly recommended.

Live virtual lectures

Two live online lectures are part of the online training programme. These live events are not mandatory, but participation is strongly recommended. The lectures cover:

ENERGY YIELD OF RE

midsemester

(1 hour)

FINANCIAL ASPECTS OF RE

end of semester

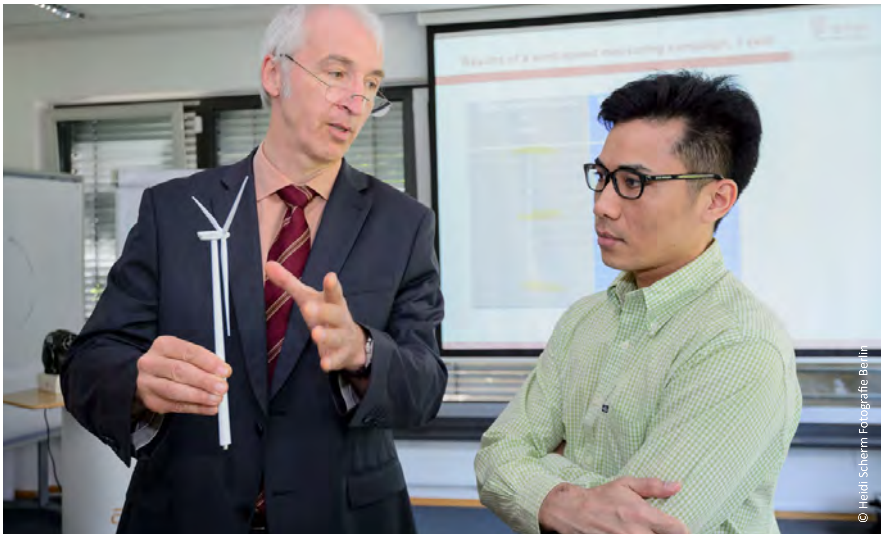
(1 hour)

Assessment and certificates

RENAC Online Academy programme final marks comprise the marks obtained on the programme's final exam (weighted 90% of total) and those from programme assignments (weighted 10% of total). The passing mark is 70%. For the exam to be computed in the overall mark, it must also have been passed (i.e. the exam mark must also be over 70%). This programme's exam is made up of two parts: the first covers the three core courses and the second the mandatory elective specialisation(s). If one elective is chosen, the exam lasts 90 minutes, with each additional elective adding more questions to the exam to cover it and a bit more time to answer these questions, making the exam longer. To prepare, participants should work through the self-test questions at the end of each of the core courses and those at the end of the mandatory elective courses of their choosing. Participants who score below 70% in the exam are eligible to receive a certificate of attendance provided they have attempted all the self-tests in the mandatory courses (i.e. at least 4 self-tests). Certificates are sent as PDF files via email. Participants who do not pass the exam the first time may attempt it again at a later date. Exam and retake dates will be announced during the introductory webinar.

PLEASE NOTE

RENAC uses plagiarism detection software to detect its presence in submitted assignments. Plagiarism, using someone else's work or ideas as if they were your own, is unacceptable. When completing assignments, participants must acknowledge any work by others that has been included in their answers by referencing its authors.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CONTENT DETAILS OF CORE COURSES

RENEWABLE ENERGY FEASIBILITY ASSESSMENT AND INVESTMENT VALUATION

After completing this course, participants should be able to:

- explain basic financial principles including the time value of money and how to determine the cost of capital;
- understand capital budgeting tools used to assess renewable energy investment attractiveness;
- calculate important economic parameters to assess the viability of a renewable energy project; and
- explain the concepts of risk and uncertainty as well as risk assessment instruments.

Content

Basic financial principles and concepts

- Feasibility studies
- The time value of money: interest and future value; present value and discounting; interest rate components
- Discount rates and the required rate of return concept
- The weighted average cost of capital (WACC)

Financial performance indicators

- The basic cash flow valuation model
- Net present value (NPV)
- Rates of return: simple internal rate of return (IRR) and modified internal rate of return (MIRR)
- Payback periods: simple payback (SPB) period and discounted payback (DPB) period
- Profitability index (PI)
- Comparing investment alternatives

RE project risks and uncertainties

- General risk assessment instruments in investment appraisal
- Sensitivity analysis
- Scenario analysis
- Simulations using Monte Carlo analysis
- Risk reduction in practice

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POLICY FRAMEWORKS FOR RENEWABLE ENERGY POWER GENERATION

After completing this course, participants should be able to:

- analyse and design the most widely used support mechanisms for renewable energy (feed-in tariff, net-metering, auctions and other schemes);
- list and understand the conditions to design successful support mechanisms or regulatory policies; and
- discuss the suitability of various policy mechanisms for different phases of the energy transition.

Content

Introduction to renewable energy policy and target setting

- Objectives of RE policies
- Cost-competitiveness of RE technologies
- RE target setting: international trends and types of targets
- Quota-based mechanisms
- Categorisation of support mechanisms for RE
- Combining support mechanisms: FiTs and auctions

Net metering for distributed generation (prosumers/self-consumption)

- Cost developments for distributed generation (roof-top PV)
- Grid parity and self-consumption
- Net metering design: caps in net metering schemes, roll-over provisions/pricing methodology
- Case study
- Increased risks for prosumers financing projects based on self-consumption
- Outlook: rate design options for electricity pricing

Feed-in tariffs for distributed generation and large-scale projects

- Introduction to feed-in tariff (FiT) design
- FiT design: long payment duration under FiT regimes
- FiT design: value-based and cost-based tariff calculation
- Practical considerations of calculating FiTs
- Input data for cost-based FiT tariff calculation: CAPEX and OPEX parameters and financing costs
- FiT design: tariff degression, capacity caps and feed-in premiums
- Location specific support for FiTs
- Summary of advantages and disadvantages of FiTs

Competitive procurement/ auctions for large-scale projects

- Introduction to auction mechanisms
- Recent auction results for wind and PV from around the world
- Auction design: procurement frequency and technology neutral vs technology specific auctions
- Price-finding mechanism, penalties for non-compliance and pre-qualifications
- Case study: South Africa's REIPPP
- Auction design: selection criteria
- Location-specific support: location-specific auctions (pre-selected sites and development zones)
- Summary of advantages and disadvantages of auctions

Additional incentives

- Fiscal incentives: tax credits, accelerated depreciation, rebates and investment incentives
- Low-interest loans
- Corporate PPAs: contractual arrangements, design features, recent trends and regulatory frameworks

Grid connection, grid bottlenecks and related regulatory frameworks

- Priority grid access
- Cost sharing for grid connection
- Priority dispatch
- Examples of approaches to RE curtailment and system integration: Japan and Germany
- Curtailment and blind system regulation

RENEWABLE ENERGY PROJECT FINANCE

After completing this course, participants should be able to:

- explain the different financing options for renewable energy projects in principle and the project finance option in more detail;
- perform a risk assessment for renewable energy projects;
- understand a bank's perspective of the risks related to PV, wind, and biogas plants; and
- collect the data required for a bankability assessment of a renewable energy project.

Content

Available financing options

- Balance-sheet financing, project financing, and capital market financing

SPV contract negotiation

- Project investment agreements
- Operating and financing agreements

Business planning

- Estimating a project's cash outflows and inflows
- The cash flow waterfall concept
- Calculating project revenues
- Operating cost calculations and taxes payable
- From CADS to ECF
- Decommissioning costs and terminal values

Bankability assessment

- The importance of bankability assessments
- Information asymmetries and moral hazard
- Setting credit limits to prevent moral hazard
- Differentiating between risk and uncertainty
- The financial value of risk and ABC analysis
- RE project risks and mitigation measures
- RE project due diligence advisors
- Design of a "project data room"

Financial engineering

- Key financial ratios
- Calculating the LLCR, PLCR and the maximum borrowing capacity

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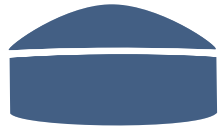
CONTENT DETAILS OF ELECTIVE SPECIALISATION COURSES

BIOGAS – APPLICATION (OPTIONAL)

After completing this course, participants should 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; and
- evaluate biogas systems based on economic and environmental aspects.



Content

Biogas applications

- What is biogas?
- Benefits of biogas
- The role of bioenergy in the energy mix

Biogas production

- Biogas production through anaerobic digestion
- Substrates
- Methane yield of substrates: shares of dry matter and organic dry matter
- Biogas yield
- Substrate quality
- Anaerobic digestion process parameters: temperature, pH and inhibiting substances

Biogas plant output

- Biogas: conditioning, direct combustion, combined heat and power generation, and biogas upgrading (CO_2 separation)
- Digestate

Biogas system classification

- Household digesters: fixed-dome digesters, floating-drum digesters, and tubular digesters
- Covered lagoon systems: non-agitated covered and agitated covered lagoons
- Industrial plants: agricultural plants, municipal solid waste plants, and wastewater treatment plants

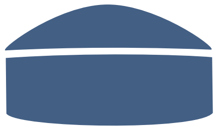
Economic and environmental aspects

- Investment and capital expenditure
- Operating expenditures: substrate costs, general operating costs, digestate costs
- Environmental aspects and health and safety

PLANNING OF MEDIUM - SIZED BIOGAS PLANTS (MANDATORY)*

After completing this course, participants should be able to:

- describe the anaerobic digestion process and relevant process parameters;
- discuss special substrates and technologies for biogas production in connection with sustainability issues; and
- explain all the necessary steps from planning to operation and maintenance as well as the functioning of system components and their respective applications.



Content

The anaerobic digestion process

- Stages of the process
- Continuous and batch systems
- Dry fermentation and plug flow systems
- Process control and digestion parameters
- Special additives for substrates

Special substrates and sustainability

- Industrial substrates: wastewaters and wastes
- Pre-treatment of waste
- Sustainability aspects: CO_2, and food vs fuel

Special technologies for biogas production

- Low-tech household size biogas plants
- Industrial biogas plants
- UASB

Main components

- Pre-treatment of feedstock
- Feeding/conveying of solid biomass
- Substrate pumps
- Reactors
- Piping on biogas plants
- Biogas conditioning: drying and cleaning
- Stirring devices

Biogas applications

- CCHP (combined cooling heat and power)
- Biogas upgrading
- District heating
- Satellite CHP units

Treatment of digestate

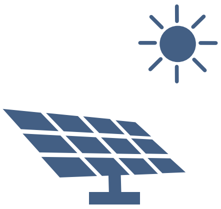
- Digestate separation
- Digestate drying

Detailed example of a biogas plant

- Plant concept and design
- Feasibility studies
- Project realisation
- Safety aspects
- Cash flow analysis

Operation and maintenance

PV — APPLICATION (OPTIONAL)



After completing this course, participants should 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 ratios;
- explain which factors influence the capital and operational expenditures of PV systems, and give examples of system costs in different countries around the world; and
- perform basic calculations of payback time and unit cost of electricity for grid-connected and off-grid PV systems.

Content

Grid-connected PV applications

- Residential PV systems
- Commercial and industrial (C&I) PV systems
- Utility-scale PV power plants

Off-grid PV applications

- Solar home systems
- Telecom towers
- Street lightning
- Refrigeration
- Mobile phone charging
- Water pumping

Energy flow and metering options

- Energy generation profiles
- Metering options (gross -metering and net -metering)
- Energy flow in grid-connected systems with and without storage
- Providing backup power or going off-grid
- Where to connect the storage system and why energy efficiency matters

Solar irradiation and space requirements

- Solar irradiation around the globe and on inclined surfaces
- Space required for the PV array

PV system energy yield

- Peak sun hours (PSH) and performance ratio (PR)
- Energy yield calculation for grid-connected systems
- Available energy for end-users of PV systems with storage

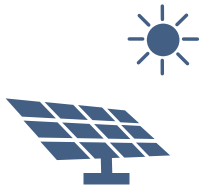
Economics of PV systems

- Capital expenditure, operating expenditure, payback, and unit cost of electricity
- Economics of grid-connected PV systems
- Economics and financing of off-grid PV systemsPeak sun hours (PSH) and performance ratio (PR)
- Energy yield calculation for grid-connected systems
- Available energy for end-users of PV systems with storage

PLANNING OF LARGE-SCALE PV GRID-CONNECTED SYSTEMS (MANDATORY)*

After completing this course, participants should be able to:

- list and describe the main components making up a PV power plant;
- describe the contracts, studies and permissions required for PV project development;
- list the main project steps from project planning through to system operation; and
- describe the key tasks in assessing and supervising the implementation of a large-scale PV power plant.



Content

Project mission

- Commercial viability of large PV systems
- Supply options

Main system components

- PV modules: PV module standards and certification, limits of module testing, and consequences of mismatching PV modules in PV array strings
- Inverter concepts
- Transformers: types and relative costs
- Switchgear
- Monitoring and control
- Irradiation measurement

Project development

- The life cycle of a large PV plant
- Feasibility studies: site assessment and estimating yield and costs
- Contracts

Project planning

- Yield assessment: solar radiation data sources, landscape topology, technical availability of PV systems, yield assessment and project bankability
- Legal and regulatory issues: permits and licenses, access to the grid and access to the electricity market
- Environmental considerations for site selection
- Infrastructure

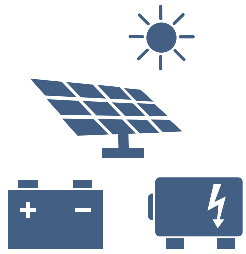
Construction and installation

- Construction and installation planning
- Practical aspects of construction and installation
- System commissioning procedures and documentation
- PV plant decommissioning and dismantling

Operating PV plants

- Monitoring and power output control
- Operating modes

PV-DIESEL HYBRID SYSTEMS (OPTIONAL)



After completing this course, participants should be able to:

- estimate the potential of, and identify suitable locations for, PV-diesel hybrid systems;
- describe the main system components and what they are used for;
- explain the basic parameters for system sizing and dynamic system behaviour; and
- evaluate PV-diesel hybrid systems from an economic perspective.

Content

Basics of PV-diesel hybrid systems

- Access to electricity
- Micro and hybrid power systems
- Grid extension costs
- Categories of PV-diesel hybrid systems

System components

- Structure of small hybrid power systems
- Diesel generators: technical basics, energy transformation process, operation and efficiency
- Balance of systems
- SMA fuel save controller components

System sizing

- Load profile
- Peak load
- Penetration rate
- Energy share
- Generator minimum loading

Dynamic system behaviour

- Behaviour on a sample day
- Different set-ups
- Adding storage
- Energy efficiency and demand side management

Economic analysis

- Lifetime of components
- Cost structure of hybrid systems
- Levelized cost of electricity (LCOE) from pure diesel generator systems
- Levelized cost of electricity (LCOE) of hybrid systems
- Mini-grid vs. single household systems

Case studies

- Vava'u, Kingdom of Tonga
- Palladam, India

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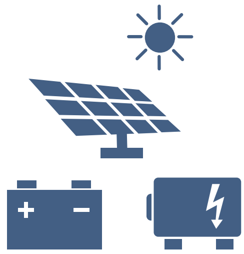
PLANNING OF PV-DIESEL HYBRID SYSTEMS (MANDATORY)*



After completing this course, participants should be able to:

- distinguish between different system designs and understand their most suitable applications;
- lead a feasibility study to integrate PV into an existing diesel power system;
- explain the functioning of a PV-diesel hybrid system's components, its operating strategies and its optimising potential; and
- assess and supervise the planning and implementation of a PV-diesel power plant.

Content

Introduction to PV-diesel hybrid power stations

- Diesel power plants: applications and characteristics
- Global distribution of diesel plants
- Off-grid sectors and target groups for hybridisation projects
- PV-diesel hybrid systems: conditions for economic attractivenes

Assessing project feasibility

- The importance of accuracy in data collection and processing
- Typical load profiles and their monitoring and assessment
- Load profile projections
- Diesel engines and generators, electric generators, and operational limits of diesel gensets
- System stability in diesel based mini-grids
- Example study

Technical aspects of conversion from diesel-only to PV-diesel hybrid

- PV-diesel hybrid system control and mini-grid internal communication infrastructure
- Sensors and actuators
- Active and passive control systems
- Load-driven control in mini-grids: spinning reserves and N+1 criteria
- PV-diesel hybrid system limitations
- Electrical protection in mini-grids and operational strategies
- Effects of PV-hybridisation on diesel generator operation and effect of hybridisation on diesel generator working lives
- PV-diesel hybrid system dynamics and fluctuating PV power output
- Frequency deviations, voltage fluctuations and inrush currents on mini-grids

Additional options to optimise systems

- The impact of a diesel generator setup on mini-grid performance
- Storage technologies for mini-grids
- Lead-acid and lithium-ion batteries
- Battery integration, management and control
- System stability and energy storage

Financial analysis – key parameters

- Cash flow structure and LCOE for diesel-only and PV-diesel hybrid systems
- Influence of financing costs on cash flows

Installation, commissioning, operation and maintenance

- Pre-Installation checklist
- Installation and preparation for commissioning
- Commissioning
- General plant maintenance
- System operation, control and monitoring

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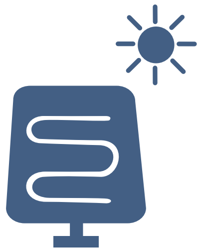
SOLAR THERMAL — APPLICATION (OPTIONAL)

After completing this course, participants should be able to:

- explain the relevance of solar thermal in the energy mix and its basic economics;
- explain how solar thermal systems and their system components work;
- differentiate between types of solar thermal systems and solar thermal collectors; and
- describe the basics of system sizing, installation, commissioning, operation and maintenance.



Content

Fundamentals of solar thermal energy

- The role of solar thermal
- The pervasiveness of solar energy
- Types of renewable energy derived from the sun

How solar thermal works

- How solar radiation is absorbed by the solar thermal collector
- How solar thermal works
- Solar thermal applications

Solar thermal collectors

- Absorbers
- Flat plate collectors
- Evacuated tube collectors
- Efficiency of solar collectors

System types

- Thermosiphon (or gravity flow) systems and forced circulation systems
- Open and closed systems
- Direct and indirect systems

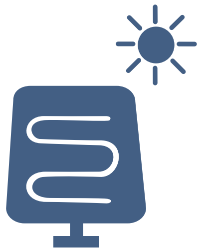
Solar thermal system components

- Storage tanks
- Pumps and controllers
- Other system components

Practical considerations and economics of solar thermal systems

- Basic system design
- Installation, commissioning, operation and maintenance
- Economics of solar thermal systems

PLANNING OF LARGE-SCALE SOLAR THERMAL SYSTEMS (MANDATORY)*



After completing this course, participants should be able to:

- explain how large-scale solar thermal systems work and describe different system components and their respective performance standards;
- distinguish between different large-scale system configurations and describe their areas of application;
- manage the designing of a large-scale system and the sizing specification of components; and
- describe key tasks in installation, commissioning, fault-finding and maintenance.

Content

Solar thermal collectors

- Losses in a solar collector
- Selective absorber coatings
- Flat plate collectors configurations
- Evacuated tube collectors
- Solar collector efficiency
- Standards and collector test procedures

Storage tanks and other system components

- Functionality, types and applications of storage tanks
- Heat exchangers and pumps
- Valves and fittings in large-scale solar thermal installations
- Sensors and controllers

System types

- Thermosiphon (or gravity flow) and forced circulation systems
- Open vs closed systems and direct vs indirect systems
- DHW systems with buffer tanks
- Systems with multiple consumers and bac-kup systems
- Heat transfer in systems with buffer tanks
- Recirculation and mixing valves
- Large-scale system configurations

Sizing

- Efficiency and solar fraction
- Calculation of heat quantity
- Stagnation
- Pressures in closed, pressurised systems
- System design and the relationship between solar fraction and system efficiency

Solar thermal system components

- Storage tanks
- Pumps and controllers
- Other system components

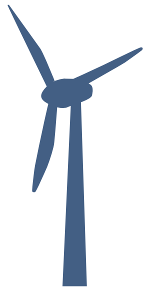
Detailed design example

- Sizing example and solar irradiation at the site
- Calculation of the energy demand, collector area and storage tank capacity
- Choice of system configuration and collectors
- Collector array configuration and flow rate
- Pipe diameter and pressure loss
- Calculation of pressure losses in the system
- Pump selection and heat exchanger sizing
- Pressures in the system and expansion vessel sizing

Implementation

- Practical aspects
- Commissioning, frequent faults and economic aspects

WIND POWER - APPLICATION (OPTIONAL)



After completing this course, participants should be able to:

- list the different applications of wind turbines and name the turbine components; and
- understand the economic and environmental aspects of wind power.

Content

Wind power applications

- Large-scale wind turbines
- Small-scale wind turbines
- Offshore wind turbines

Introduction to wind turbine components

- Principles of wind turbine design
- Towers, nacelle, rotor blades and generators
- Wind turbine power curves

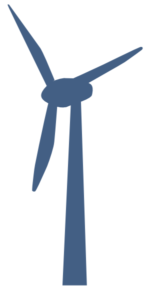
Economic aspects

- Investment costs (CAPEX)
- Operating costs (OPEX)
- Levelised cost of energy (LCOE)

Environmental aspects

- Noise
- Shadow
- Landscape and nature

WIND POWER PLANNING AND MEASUREMENT (MANDATORY)*



After completing this course, participants should be able to:

- list the fundamental wind farm planning and construction steps;
- estimate the duration of each step in a wind farm's planning process;
- know which software to use for different purposes related to wind power generation; and
- analyse and understand measured wind data and explain the importance of measuring the wind resource at the project site.

Content

Wind farm planning and design

- Planning steps overview
- Feasibility study
- Energy yield calculation
- Correlation with long term weather trend
- Formal uncertainty analysis
- Logistics, installation and commissioning

Wind measurement

- Equipment
- Light Detection and Ranging (LIDAR) and Sonic Detection and Ranging (SODAR)
- The Weibull equation

Software in the wind power sector

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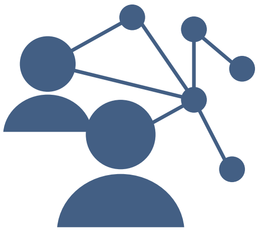
RENAC´S ONLINE ACADEMY

The Renewables Academy (RENAC) AG is a leading international provider of training, educational, and capacity building services on renewable energy technologies and energy efficiency. Since 2008, more than 25,000 participants from over 160 countries have taken part in RENAC training courses and programmes. We are convinced that knowledge and skills are the key to the sustainable development of clean and secure energy supplies and it is our mission to provide this knowledge and skills to as many people as possible.

As part of this mission, our Online Academy was founded in 2019. Today, RENAC´s Online Academy offers over 30 short courses and programmes, with participants learning with us from the comfort of their own homes around the globe.



RENAC Online helps you:

- Boost your professional career
- Study with flexibility following your own schedule
- Learn at any time and from any location

RENAC Online staff are:

- Certified e-learning trainers
- Experienced professionals
- In direct contact with industry

CERTIFIED EUROPEAN E-LEARNING MANAGER

Demo course

- We invite you to visit our online platform demonstration course: www.renac.de/demo-course

“I really enjoyed the course and the experience was well worth the money paid. Really good value for money. Many thanks and I will no doubt be back for another course in the very near future.”

Ademola Thompson, Certified Renewable Energy Project Developer: Photovoltaics, 2020

LEARNING WITH RENAC ONLINE

Learning with RENAC Online is done asynchronously in two steps. Participants first work through each course's content before getting the opportunity to apply their newly acquired knowledge and skills, consolidating them in their minds. In practice, both steps are accomplished in several ways. Programmes also contain written assignments with feedback from RENAC that not only further reinforce learning outcomes but may also complement their exam marks.

Text and images

Courses are organised into short, instructional chapters with illustrations. Learners are guided through the material step by step.

Online Forum

A discussion forum helps to support students and foster communication between them and with RENAC. This forum is monitored by RENAC staff and experts who can provide technical assistance and discussion about course topics.

Assignments

Programmes contain written assignments with individual feedback from RENAC.

Self-tests

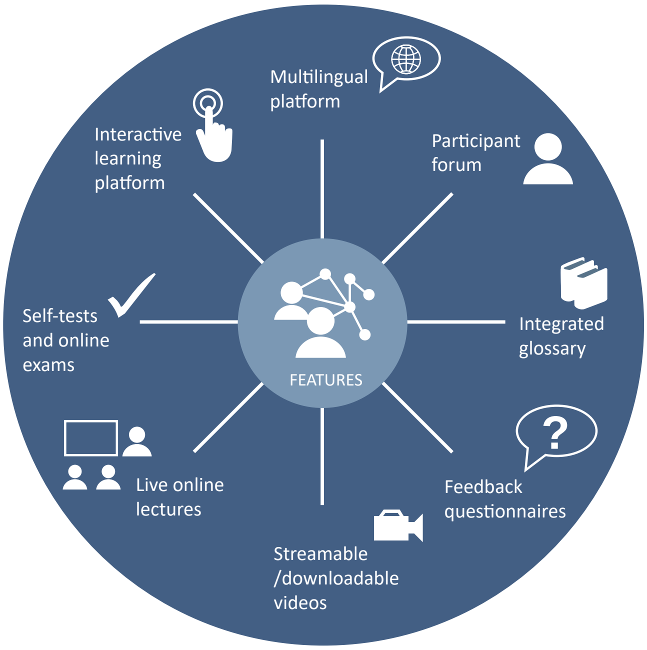
Self-tests within each course help participants assess their knowledge.

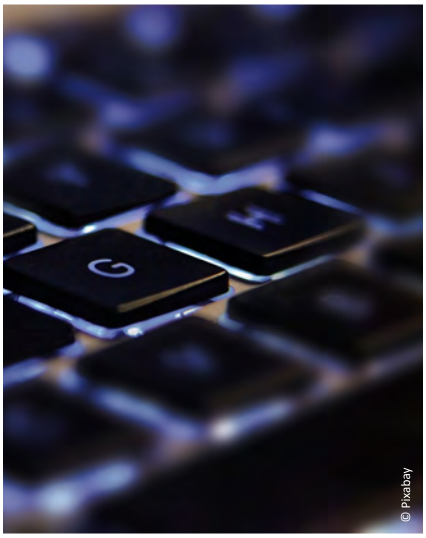
Videos

Recorded lectures cover some of the most important topics in a visual and engaging way.

Live virtual classroom

It is recommended that participants attend live virtual lectures, which are given by RE experts. During and after lectures, participants are invited to discuss the topics and issues covered in the chat function.





PRACTICAL INFORMATION

START DATES

1 April / 1 October

Spring semester and fall semester each year.

RECOMMENDED STUDY TIME

About 130 hours for mandatory courses.

DURATION

3–5 weeks per course.

6 months to complete the entire programme.

ASSIGNMENTS

Programmes are designed for a continuous participation, from the beginning of the semester until the final exam, and contain short assignments.

Assignments are short written essays or exercises involving other multimedia elements that need to be handed in by deadlines so they can count to improve the final grade of the exam.

TECHNICAL INFORMATION

You need to provide an email address in order to register and create your account, where you will receive course updates and feedback. You need access to a device with a reliable internet connection (at least 2 Mbit/s). This may be a mobile device, but we recommend using a computer. Live virtual lectures and orientation take place on Zoom, so you also need a headset or speakers to listen to the presentations.

REGISTRATION

You can register online at:
www.renac.de/online-academy

REGISTRATION DEADLINE

10 October / 10 April

FEE

EUR 1,190.00 including 19 % of German VAT

DISCOUNTS

Early bird 10%; group (2 or more) 5%; combination of both 15%; Alumni 10%

EARLY BIRD DISCOUNT DEADLINE

20 August / 20 February

PAYMENT METHODS

VISA, MasterCard, American Express, PayPal, or bank transfer

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Start of semester: 1 April and 1 October

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Renewables Academy Online

www.renac.de/online-academy