COURSE OVERVIEW NE0015
Introduction to Energy Integration

Course Title
Introduction to Energy Integration

Course Date/Venue
Session 1: June 29-July 03, 2025/Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
Session 2: December 14-18, 2025/Crowne Meeting Room, Crowne Plaza Al Khobar, an IHG Hotel, Al Khobar, KSA

3.0 CEUs (30 PDHs) AWARD

Course Reference
NE0015

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Description

This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.

This course is designed to provide participants with a detailed and up-to-date overview on the Fundamentals of Renewable Energy Integration. It covers the various renewable energy sources and the comparison of renewable and non-renewable energy sources; the environmental and economic benefits of renewable energy; the role of renewable energy in sustainable development; the current trends and statistics in global and local renewable energy adoption; and the basics of solar and wind energy.

Further, the course will also discuss the solar energy systems design for residential, commercial and industrial applications; the factors affecting solar power system design; the wind energy systems design, grid-connected solar and wind systems and energy storage solutions; the technical challenges of renewable integration and the role of smart grids in renewable energy integration; and the demand response, load management and real-time monitoring and control systems.

During this interactive course, participants will learn the maintenance of power quality with high penetration of renewables; the economic analysis of renewable energy projects; assessing the environmental impact of renewable energy projects; the mitigation strategies for minimizing environmental impact; the renewable energy policies and regulations, community engagement and social acceptance; the project planning and implementation and best practices for operating and maintaining solar and wind power systems; monitoring the performance of renewable energy systems; and the key performance indicators (KPIs), data analysis and risk management strategies and tools.

Course Objectives

Upon the successful completion of this course, each participant will be able to:-

- Apply and gain a fundamental knowledge on renewable energy integration
- Discuss the various renewable energy sources and the comparison of renewable and non-renewable energy sources
- Explain the environmental and economic benefits of renewable energy and the role of renewable energy in sustainable development
- Discuss the current trends and statistics in global and local renewable energy adoption including the basics of solar and wind energy
- Describe the solar energy systems design for residential, commercial and industrial applications as well as the factors affecting solar power system design
- Recognize wind energy systems design, grid-connected solar and wind systems and energy storage solutions
- Discuss technical challenges of renewable integration and the role of smart grids in renewable energy integration
- Employ demand response, load management and real-time monitoring and control systems
- Maintain power quality with high penetration of renewables and discuss the economic analysis of renewable energy projects
- Assess the environmental impact of renewable energy projects and mitigation strategies for minimizing environmental impact
- Discuss renewable energy policies and regulations, community engagement and social acceptance
- Apply project planning and implementation and best practices for operating and maintaining solar and wind power systems
- Monitor the performance of renewable energy systems and apply key performance indicators (KPIs), data analysis and risk management strategies and tools

Exclusive Smart Training Kit - H-STK®

*Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK®**). The **H-STK®** consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of fundamentals of renewable energy integration for engineers and technicians, energy policy makers and regulators, project managers, environmental scientists and specialists, Utility Company Employees and other technical staff.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Haward's certificates are accredited by the following international accreditation organizations: -

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

- The International Accreditors for Continuing Education and Training (IACET - USA)

  Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

  Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

  Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:

Mr. Dimitry Rovas, CEng, MSc, PMI-PMP, is a **Senior Engineer** with extensive industrial experience in **Oil**, **Gas**, **Power** and **Utilities** industries. His expertise includes **Gas Conditioning & Processing**, **Process Plant** Optimization, Effective **Production Operations** in the Oil & Gas Fields, Advanced Process Safety Management (**PSM**), **Process Equipment** Design, Applied **Process** Engineering, **Oil Production & Processing** Facilities, Pr**ocess Plant Optimization & Rehabilitation**, **Process Plant** Troubleshooting & Engineering Problem Solving, **Operations Abnormalities & Plant Upset**, **Glass Reinforced Plastics**, **GRP Resins**, **Pipe Products & Applications**, **Pipe** System Designs & Installation, **Steel & Fiberglass** Construction, **GRP Linings** & Method Application, **Rubber Com**pounding, Elastomers, Thermoplastic, Industrial Rubber Products, Rubber Manufacturing Systems, **Heat Transfer**, **Vulcanization** Methods, **Energy Conservation**, **Energy Loss** Management in Electricity Distribution Systems, **Energy Saving**, **Thermal Power Plant** Management, **Thermal Power Plant** Operation & Maintenance, **Gas & Steam Turbines**, **Turbine Operations**, **Heat Transfer**, **Machine Design**, **Fluid Mechanics**, **Heating & Cooling Systems**, **Heat Insulation** Systems, **Heat Exchanger & Cooling Towers**, **Mechanical Erection**, **Heavy Rotating Equipment**, **HAZMAT & HAZCOM**, **Hazardous Materials & Chemicals MSDS**, Modern Heating, Ventilation, Air-Conditioning (**HVAC**) **& Refrigeration** Systems, Emergency **Air Compressors**, **Gas Turbine** Condition Monitoring & Fault Diagnosis, Modern **Valve** Technology, **Pumps & Valves**, Detailed Engineering Codes & Standards, **Hydraulic** System Overhaul & Troubleshooting, **Hydraulic** System Design & Troubleshooting, **Boiler** Maintenance & Inspection, **Pipe Stress** Analysis, Material Unloading & Storage, Commissioning & Start-Up. Further, he is also well-versed in MS project & AutoCAD, EPC Power Plant, Power Generation, Combined Cycle Powerplant, Leadership & Mentoring, Project Management, Strategic Planning/Analysis, Construction Management, Team Formation, Relationship Building, Communication, Reporting and Six Sigma. He was the **Project Manager** wherein he was managing, directing and controlling all activities and functions associated with the domestic heating/cooling facilities projects.

During his life career, Mr. Rovas has gained his practical and field experience through his various significant positions and dedication as the **EPC Project Manager**, **Field Engineer**, **Preventive Maintenance Engineer**, **Researcher**, **Instructor/Trainer**, **Telecom Consultant** and **Consultant** from various companies such as the Podaras Engineering Studies, Metka and Diadikasia, S.A., **Hellenic Petroleum Oil Refinery** and COSMOTE.

Mr. Rovas is a **Chartered Engineer** of the **Technical Chamber** of **Greece**. Further, he has **Master** degrees in **Mechanical Engineering** and **Energy Production & Management** from the **National Technical University of Athens**. Moreover, he is a **Certified Instructor/Trainer**, a **Certified Project Management Professional** (**PMP**), a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**) and a **Certified Six Sigma Black Belt**. He is an active member of Project Management Institute (**PMI**), Technical Chamber of Greece and Body of Certified Energy Auditors and has further delivered numerous trainings, seminars, courses, workshops and conferences internationally.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

30% Lectures
20% Practical Workshops & Work Presentations
30% Hands-on Practical Exercises & Case Studies
20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Course Fee

US$ 5,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the workshop for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Overview of Renewable Energy Sources*** *Introduction to Various Renewable Energy Sources (Solar, Wind, Hydro, Biomass, Geothermal) • Comparison of Renewable & Non-Renewable Energy Sources*
0930 – 0945	*Break*
0945 – 1030	***Importance of Renewable Energy*** *Environmental & Economic Benefits of Renewable Energy • Role of Renewable Energy in Sustainable Development*
1030 – 1130	***Global & Local Trends in Renewable Energy*** *Current Trends & Statistics in Global & Local Renewable Energy Adoption • Government Policies & Incentives for Renewable Energy*
1130 – 1215	***Basics of Solar Energy*** *Principles of Solar Energy Generation • Types of Solar Technologies (Photovoltaic, Solar Thermal)*
1215 – 1230	*Break*
1230 – 1420	***Basics of Wind Energy*** *Principles of Wind Energy Generation • Types of Wind Turbines & their Applications*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0830	***Solar Energy Systems Design*** *Designing Solar Power Systems for Residential, Commercial, & Industrial Applications • Factors Affecting Solar Power System Design (Location, Shading, Orientation)*
0830 – 0930	***Wind Energy Systems Design*** *Designing Wind Power Systems for Various Applications • Factors Affecting Wind Power System Design (Site Assessment, Wind Speed, Turbine Selection)*
0930 – 0945	*Break*
0945 – 1100	***Grid-Connected Solar Systems*** *Integration of Solar Power Systems with the Grid • Grid-Tied versus Off-Grid Solar Systems*
1100 – 1215	***Grid-Connected Wind Systems*** *Integration of Wind Power Systems with the Grid • Challenges & Solutions for Grid-Connected Wind Systems*
1215 – 1230	*Break*
1230 – 1420	***Energy Storage Solutions*** *Importance of Energy Storage in Renewable Energy Systems • Types of Energy Storage Technologies (Batteries, Pumped Hydro, Flywheels)*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0830	***Technical Challenges of Renewable Integration*** *Variability & Intermittency of Renewable Energy Sources • Impact on Grid Stability & Reliability*
0830 – 0930	***Grid Modernization & Smart Grids*** *Role of Smart Grids in Renewable Energy Integration • Technologies & Components of Smart Grids*
0930 – 0945	*Break*
0945 – 1100	***Advanced Grid Management Techniques*** *Demand Response & Load Management • Real-Time Monitoring & Control Systems*
1100 – 1215	***Power Quality & Reliability*** *Maintaining Power Quality with High Penetration of Renewables • Solutions to Power Quality Issues (Harmonics, Voltage Sags/Swells)*
1215 – 1230	*Break*
1230 – 1420	***Case Studies: Successful Renewable Integration*** *Analysis of Successful Renewable Energy Integration Projects Worldwide • Lessons Learned & Best Practices*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 – 0830	***Economic Analysis of Renewable Energy Projects*** *Cost-Benefit Analysis of Renewable Energy Projects • Financial Incentives & Funding Options*
0830 – 0930	***Environmental Impact of Renewable Energy*** *Assessing the Environmental Impact of Renewable Energy Projects • Mitigation Strategies for Minimizing Environmental Impact*
0930 – 0945	*Break*

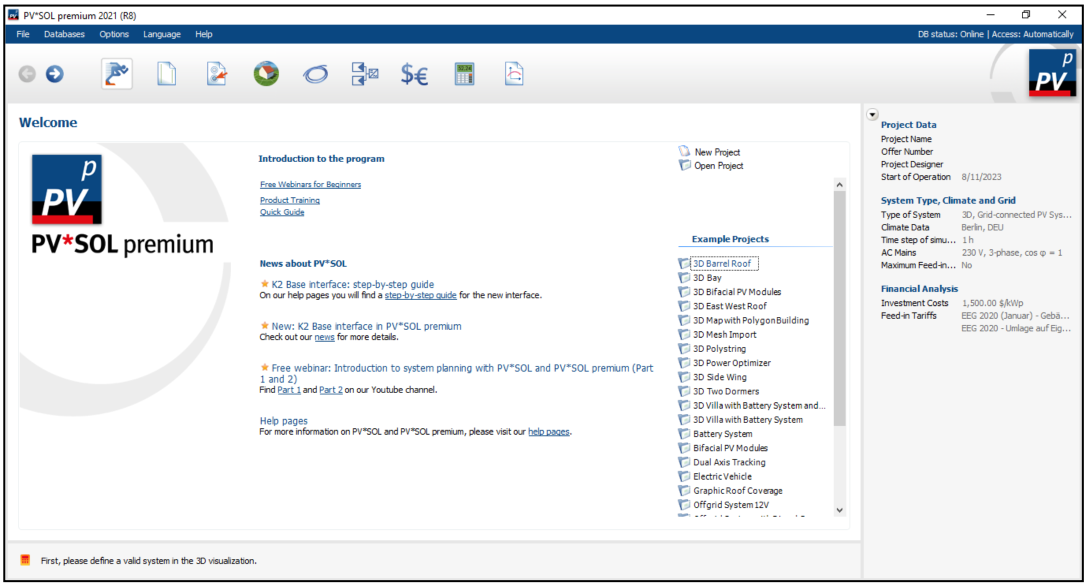
0945 – 1100	***Renewable Energy Policies & Regulations*** *Overview of Policies & Regulations Supporting Renewable Energy • Compliance & Permitting Processes for Renewable Energy Projects*
1100 – 1215	***Community Engagement & Social Acceptance*** *Importance of Community Engagement in Renewable Energy Projects • Strategies for Gaining Social Acceptance & Support*
1215 – 1230	*Break*
1230 – 1330	***Future Trends in Renewable Energy*** *Emerging Technologies & Innovations in Renewable Energy • Future Directions for Renewable Energy Development*
1330 – 1420	***Hands-On Session: Economic & Environmental Assessment*** *Practical Exercises on Conducting Economic & Environmental Assessments for Renewable Energy Projects • Case Study Analysis & Group Discussions*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

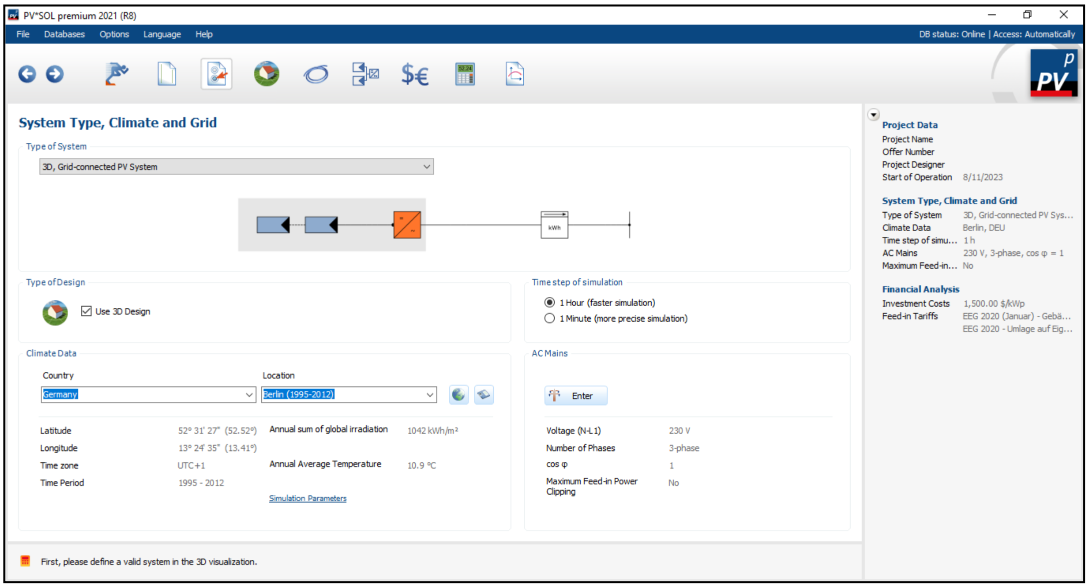
Day 5

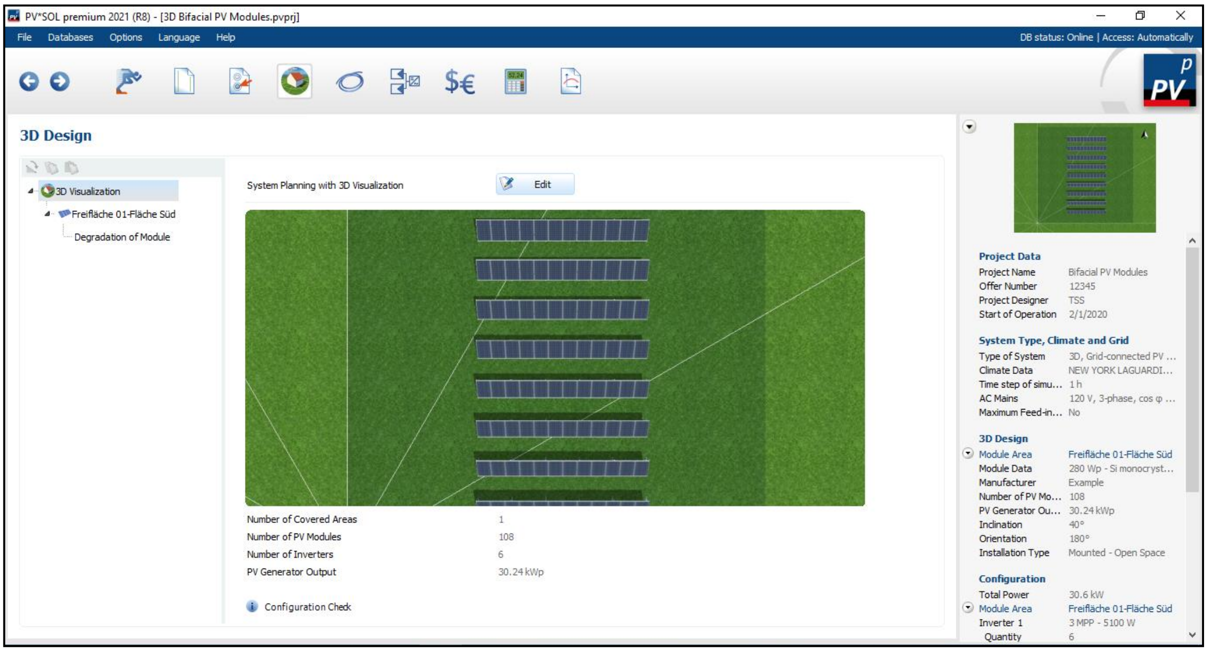
0730 – 0930	***Project Planning & Implementation*** *Steps in Planning & Implementing Renewable Energy Projects • Key Considerations for Successful Project Execution*
0930 – 0945	*Break*
0945 – 1045	***Operation & Maintenance of Renewable Systems*** *Best Practices for Operating & Maintaining Solar & Wind Power Systems • Troubleshooting Common Issues in Renewable Energy Systems*
1045 – 1230	***Monitoring & Evaluation*** *Techniques for Monitoring the Performance of Renewable Energy Systems • Key Performance Indicators (KPIS) & Data Analysis*
1230 – 1245	*Break*
1245 – 1345	***Risk Management in Renewable Projects*** *Identifying & Mitigating Risks in Renewable Energy Projects • Risk Management Strategies & Tools*
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

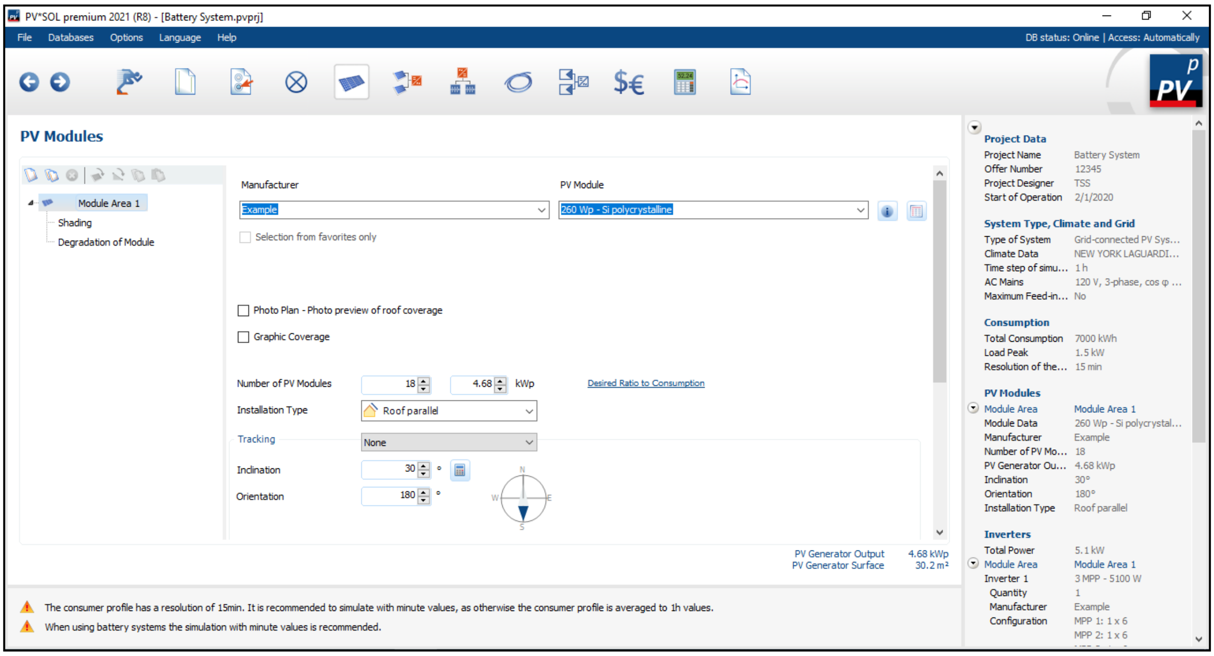
Simulators (Hands-on Practical Sessions)

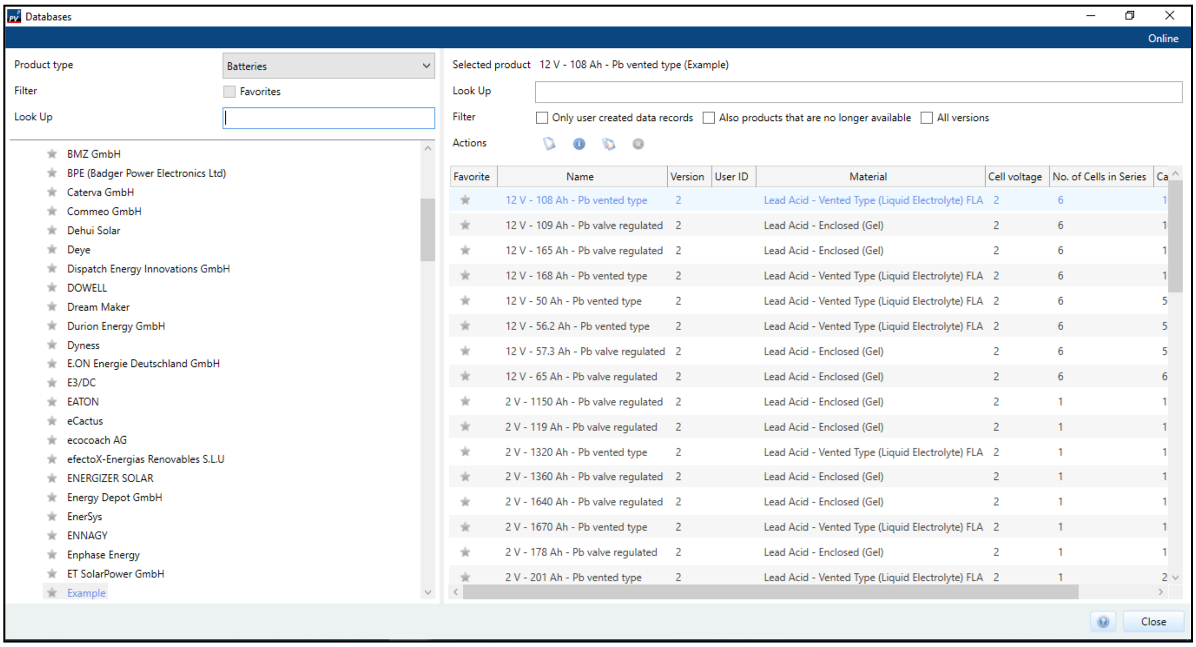
Practical session will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the simulator “PV*SOL Premium”.

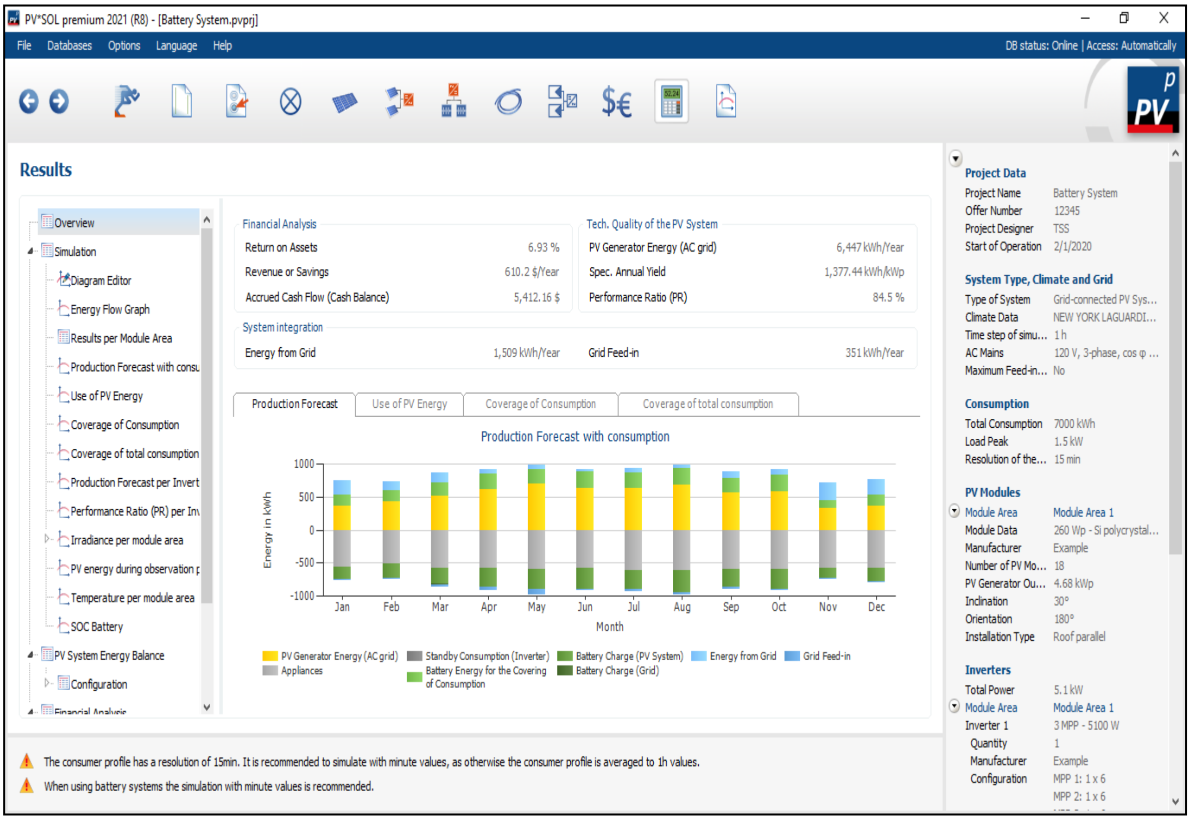





PV*SOL premium 2021 (R8) - [3D Bifacial PV Modules.pvprj]
File Databases Options Language Help
DB status: Online | Access: Automatically
3D Design
3D Visualization
Freifläche 01-Fläche Süd
Degradation of Module
System Planning with 3D Visualization
Edit
Number of Covered Areas 1
Number of PV Modules 108
Number of Inverters 6
PV Generator Output 30.24 kWp
Configuration Check
Project Data
Project Name Bifacial PV Modules
Offer Number 12345
Project Designer TSS
Start of Operation 2/1/2020
System Type, Climate and Grid
Type of System 3D, Grid-connected PV ...
Climate Data NEW YORK LAGUARDI...
Time step of simu... 1 h
AC Mains 120 V, 3-phase, cos φ ...
Maximum Feed-in... No
3D Design
Module Area Freifläche 01-Fläche Süd
Module Data 280 Wp - Si monocryst...
Manufacturer Example
Number of PV Mo... 108
PV Generator Ou... 30.24 kWp
Inclination 40°
Orientation 180°
Installation Type Mounted - Open Space
Configuration
Total Power 30.6 kW
Module Area Freifläche 01-Fläche Süd
Inverter 1 3 MPP - 5100 W
Quantity 6


PV*SOL premium 2021 (R8) - [Battery System.pvprj]
File Databases Options Language Help
DB status: Online | Access: Automatically
PV Modules
Module Area 1
Shading
Degradation of Module
Manufacturer
Example
PV Module
260 Wp - Si polycrystalline
Selection from favorites only
Photo Plan - Photo preview of roof coverage
Graphic Coverage
Number of PV Modules 18 4.68 kWp
Desired Ratio to Consumption
Installation Type Roof parallel
Tracking None
Inclination 30 °
Orientation 180 °
PV Generator Output 4.68 kWp
PV Generator Surface 30.2 m²
The consumer profile has a resolution of 15min. It is recommended to simulate with minute values, as otherwise the consumer profile is averaged to 1h values.
When using battery systems the simulation with minute values is recommended.
Project Data
Project Name Battery System
Offer Number 12345
Project Designer TSS
Start of Operation 2/1/2020
System Type, Climate and Grid
Type of System Grid-connected PV Sys...
Climate Data NEW YORK LAGUARDI...
Time step of simu... 1 h
AC Mains 120 V, 3-phase, cos φ ...
Maximum Feed-in... No
Consumption
Total Consumption 7000 kWh
Load Peak 1.5 kW
Resolution of the... 15 min
PV Modules
Module Area Module Area 1
Module Data 260 Wp - Si polycrystal...
Manufacturer Example
Number of PV Mo... 18
PV Generator Ou... 4.68 kWp
Inclination 30°
Orientation 180°
Installation Type Roof parallel
Inverters
Total Power 5.1 kW
Module Area Module Area 1
Inverter 1 3 MPP - 5100 W
Quantity 1
Manufacturer Example
Configuration MPP 1: 1 x 6
MPP 2: 1 x 6


Databases
Online
Product type
Batteries
Filter
Favorites
Look Up
Selected product 12 V - 108 Ah - Pb vented type (Example)
Look Up
Filter
Only user created data records
Also products that are no longer available
All versions
Actions
BMZ GmbH
BPE (Badger Power Electronics Ltd)
Caterva GmbH
Commeo GmbH
Dehui Solar
Deye
Dispatch Energy Innovations GmbH
DOWELL
Dream Maker
Durion Energy GmbH
Dyness
E.ON Energie Deutschland GmbH
E3/DC
EATON
eCactus
ecocoach AG
efectoX-Energias Renovables S.L.U
ENERGIZER SOLAR
Energy Depot GmbH
EnerSys
ENNAGY
Enphase Energy
ET SolarPower GmbH
Example
Favorite
Name
Version
User ID
Material
Cell voltage
No. of Cells in Series
12 V - 108 Ah - Pb vented type 2 Lead Acid - Vented Type (Liquid Electrolyte) FLA 2 6
12 V - 109 Ah - Pb valve regulated 2 Lead Acid - Enclosed (Gel) 2 6
12 V - 165 Ah - Pb valve regulated 2 Lead Acid - Enclosed (Gel) 2 6
12 V - 168 Ah - Pb vented type 2 Lead Acid - Vented Type (Liquid Electrolyte) FLA 2 6
12 V - 50 Ah - Pb vented type 2 Lead Acid - Vented Type (Liquid Electrolyte) FLA 2 6
12 V - 56.2 Ah - Pb vented type 2 Lead Acid - Vented Type (Liquid Electrolyte) FLA 2 6
12 V - 57.3 Ah - Pb valve regulated 2 Lead Acid - Enclosed (Gel) 2 6
12 V - 65 Ah - Pb valve regulated 2 Lead Acid - Enclosed (Gel) 2 6
2 V - 1150 Ah - Pb valve regulated 2 Lead Acid - Enclosed (Gel) 2 1
2 V - 119 Ah - Pb valve regulated 2 Lead Acid - Enclosed (Gel) 2 1
2 V - 1320 Ah - Pb vented type 2 Lead Acid - Vented Type (Liquid Electrolyte) FLA 2 1
2 V - 1360 Ah - Pb valve regulated 2 Lead Acid - Enclosed (Gel) 2 1
2 V - 1640 Ah - Pb valve regulated 2 Lead Acid - Enclosed (Gel) 2 1
2 V - 1670 Ah - Pb vented type 2 Lead Acid - Vented Type (Liquid Electrolyte) FLA 2 1
2 V - 178 Ah - Pb valve regulated 2 Lead Acid - Enclosed (Gel) 2 1
2 V - 201 Ah - Pb vented type 2 Lead Acid - Vented Type (Liquid Electrolyte) FLA 2 1
Close


PV*SOL premium 2021 (R8) - [Battery System.pvprj]
File
Databases
Options
Language
Help
DB status: Online | Access: Automatically
Results
Overview
Simulation
Diagram Editor
Energy Flow Graph
Results per Module Area
Production Forecast with consu
Use of PV Energy
Coverage of Consumption
Coverage of total consumption
Production Forecast per Invert
Performance Ratio (PR) per In
Irradiance per module area
PV energy during observation p
Temperature per module area
SOC Battery
PV System Energy Balance
Configuration
Financial Analysis
Return on Assets 6.93 %
Revenue or Savings 610.2 $/Year
Accrued Cash Flow (Cash Balance) 5,412.16 $
Tech. Quality of the PV System
PV Generator Energy (AC grid) 6,447 kWh/Year
Spec. Annual Yield 1,377.44 kWh/kWp
Performance Ratio (PR) 84.5 %
System integration
Energy from Grid 1,509 kWh/Year
Grid Feed-in 351 kWh/Year
Production Forecast
Use of PV Energy
Coverage of Consumption
Coverage of total consumption
Production Forecast with consumption
Energy in kWh
Month
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
PV Generator Energy (AC grid)
Appliances
Standby Consumption (Inverter)
Battery Energy for the Covering of Consumption
Battery Charge (PV System)
Battery Charge (Grid)
Energy from Grid
Grid Feed-in
The consumer profile has a resolution of 15min. It is recommended to simulate with minute values, as otherwise the consumer profile is averaged to 1h values.
When using battery systems the simulation with minute values is recommended.
Project Data
Project Name Battery System
Offer Number 12345
Project Designer TSS
Start of Operation 2/1/2020
System Type, Climate and Grid
Type of System Grid-connected PV Sys...
Climate Data NEW YORK LAGUARDI...
Time step of simu... 1 h
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Maximum Feed-in... No
Consumption
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Resolution of the... 15 min
PV Modules
Module Area Module Area 1
Module Data 260 Wp - Si polycrystal...
Manufacturer Example
Number of PV Mo... 18
PV Generator Ou... 4.68 kWp
Inclination 30°
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Installation Type Roof parallel
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Configuration MPP 1: 1 x 6
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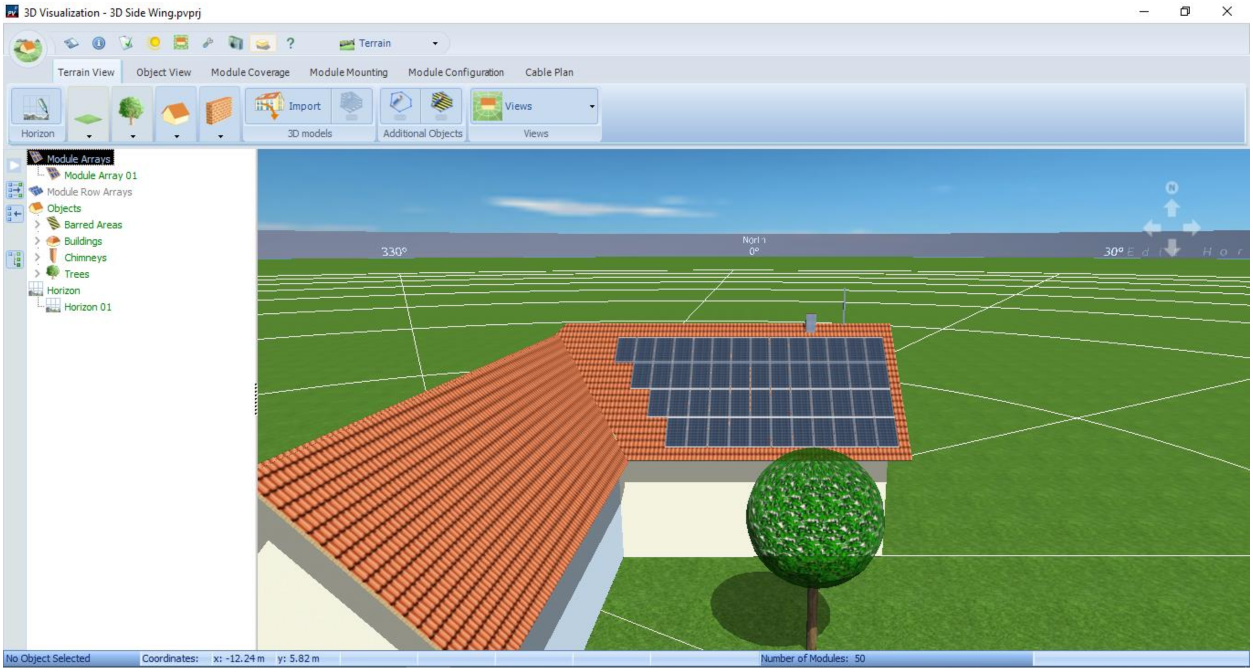

PV*SOL Premium

Course Coordinator

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org