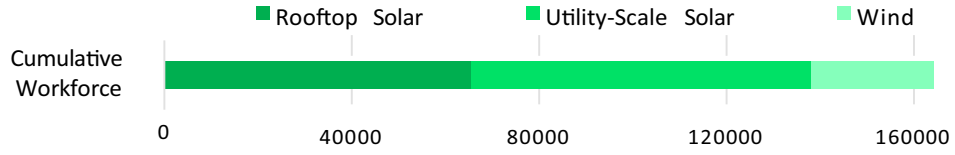
- To set up a Centre of Excellence in Renewable Energy for capacity building to meet **the immediate requirements of the Renewable Energy work-force**.
- The proposed COE would act as a **Training Facility Centre** for Institutes, General Public, Government Departments, Academics, Industries, and Startups and will provide **Technical Consultancy** to the industries and conduct **Advanced Certificate Industry –ready courses** along with high-value **research** and include **Faculty Development, Entrepreneur Development, Work- Integrated Courses, and International Certification Programs**.
- On completion, students will get:

1. **Skills University Green Technology Certificate, and**
2. **Marcraft-USA International Course Completion Certificate to prove the Physical Hands-On skills acquired in Renewable Energy.**

New opportunities from Green Growth to Green Jobs are opening today for our Startups and Youth

India's total installed Renewable Energy capacity touched 168.96 GW mark by February 2023-end. Such opportunities lead the way to over six lakhs clean jobs being created by 2030. Timely skilling interventions will be required to ensure that a skilled workforce is ready when the employment opportunities emerge.



164,000+
Cumulative Workforce were employed in the Solar and Wind Energy sectors

- Green-Tech jobs are defined as those that address either adaptation to or mitigation of climate change.
- The demand for sustainability has created two parallel workforce phenomena: the development of new careers in the green industry, such as Green-Tech solutions' installers, technicians and site auditors/managers, and the "greening" of all other jobs.
- Projections realistically show that up to 9 million new green-tech jobs will be created worldwide this decade, many of which will be in contracting and construction of Green-Tech solutions.
- The AIIPL-Marcraft line of Green-tech solutions offer early exposure to students regarding sustainable energy career options through curriculum integration and provides the "cutting edge" training necessary to ensure future employees meet workforce pipeline needs.

COE Knowledge Partner

MARCRAFT

COE PROJECT WILL BE IMPLEMENTED BY AIIPLTECH PVT LTD ALONG WITH MARCRAFT AS COE KNOWLEDGE PARTNER

AIIPL
Advanced Innovative Instruments for Professional Learning

2. Renewable Energy for Workforce Enablement

As new opportunities for job creation in the clean energy sector takes centre stage, it will be crucial to ensure that targeted upskilling/reskilling programs for the workforce are also implemented. Innovation in training delivery mechanisms results into more inclusive skilling efforts.

- **Mainstream industry relevant renewable energy courses at universities for developing highly skilled workforces:** Academic institutes should include industry relevant courses at higher education levels and leverage industrial connections to implement initiatives such as the National Credit Framework in order to mainstream skilling and vocational education.
- **Expand existing institutional capacity at state levels for sector-centric skilling programs:** State skill development agencies should bridge skill gaps and provide continuous reskilling opportunities to improve employability.
- **Support existing workforce in conventional energy sectors move towards appropriate career trajectories with initiatives for upskill, reskill and possibly re-certify competence:** Promote inclusion of skilling programs with current schemes to ensure manufacturing, investments, and exports in the value chains.

New Skills Gained & Jobs Opportunities Opened through the Training Programs in Green Technology COE

SR. NO.	MARCRAFT LAB	WHAT SKILLS WILL YOU LEARN	JOB ROLES
1	GT –1500 (Generating Clean Electrons)	Clean Electron Generation Panel provides students an introductory hands-on interactive experience with the 3 leading sources of Alternative Energy Generation Technologies – Wind, Solar, Fuel Cells.	Renewable Energy Technician Support Junior Renewable Energy Installation Technician Renewable Energy Charging Operator Battery Swapping Operator
2	GT –2500 (Sustainable Conservation)	Sustainable Conservation Technology Panel provides students an introductory hands-on interactive experience with multiple energy design, monitoring and auditing processes and technologies.	Energy Auditing Support Green Plumber Junior Energy Efficient Building Designer Environmental Protection Technician
3	GT –1000 (Solar PV Installer)	Evaluate, Design, Configure and Install PV Systems. Connect a PV System to an AC Power System using an Inverter. Drive both AC & DC Loads and Troubleshoot PV Systems.	PV System Engineer Solar Lab Technician Certified PV Technician PV Systems Installer PV System Operations and Maintenance Technician
4	GT –2000 (Wind Power Installer)	Evaluate, Design, Configure and Install Wind Turbines. Connect a Wind Power System to an AC Power System using an Inverter. Drive both AC & DC Loads and Troubleshoot Wind Power Systems.	Small Wind Turbine Engineer Certified Small Wind Turbine Technician Small Wind Turbine Systems Installer Small Wind Turbine System Operations and Maintenance Technician
5	GT –3000 (Fuel Cells Technology)	Connect, Stack, Monitor and Test Multiple Fuel Cells. Correlate Power with Hydrogen Consumption. Create and Store Hydrogen Using Off-Grid Power Sources and Run a DC Powered Device Using a Fuel Cell Power System.	Certified Fuel Cell Technician Fuel Cell Systems Installer Green Hydrogen Production Operator Green Hydrogen Application Analyst

SR. NO.	MARCRAFT LAB	WHAT SKILLS WILL YOU LEARN	JOB ROLES
6	**GT –4000 (Environmental Monitoring)**	Use Multiple Hand-held Meters to Test Water, Air, Soil, Light and Sound. Collect Data from Hand-held Meters using a Data Logger and Connect a Data Logger to a Computer to Download, Organize and Chart Data for Evaluation.	Environmental Planner Forestry Conservation Environmental Monitoring Field Technician Environmental Projects Engineer Environmental Monitoring Data Analyst
7	**GT –5000 (Hydro Power Technology)**	Explore Hydrodynamics and Evaluate Different Hydro Power sources to Run DC Loads Utilizing Different Hydro Power Generation Methods	Hydroelectric Power Engineer Hydro Operating Supervisor Certified Hydroelectric Technician
8	**GT –6000 (Bio Fuels Technology)**	Produce Biodiesel Fuel by Recycling Cooking Oil. Create Ethanol Fuel using the Fermentation and Distillation Processes. Test Fuel Purity and Use Both Fuels to Power a Radio Controlled Vehicle.	Certified Biofuels Technician Biofuels Researcher Biofuels Production Operator
9	**GT –7500 (Energy Auditing)**	Establish Working Knowledge of Standard Energy Auditing Practices and LEEDS Certification Standards. Evaluate the Energy Efficiencies of Lighting, Climate Control of Structural Designs and Insulation Materials. Effectively Use Infrared Cameras and Other Technologies for Evaluation of Residential and Commercial Buildings.	Energy Field Auditor Home Energy Rater Energy Efficient Building Designer Green Building Material Sourcing Technician
10	**POLYSUN SOLAR THERMAL PHOTOVOLTAIC SIMULATOR**	Design PV systems more efficiently visualizations and precise energy and economic analyses of PV systems. Automatic 3D visualisation of the buildings including terrain modelling	Designer Auditor Planning Project implementor

Emerging green business sector areas with high job potential:

- Green Hydrogen
- Solar Manufacturing
- EV Manufacturing, Operations and Charging Infrastructure
- Large Size Energy Storage
- Demand Side Management
- Floating Solar Power Plants
- E-waste Management
- Off Shore Wind Power Plants
- Wind-solar Hybrid and Other Renewable Energy Systems
- Biomass /Biofuels/ Bio CNG Production and Supply Chain
- De-carbonisation of Energy Intensive Sectors
- Pollution Prevention and Control Network
- Green Buildings
- Green Financing

"The continued growth of renewable energy jobs shows the potential to achieve multiple priorities of the Indian government, including employment generation, the expansion of clean energy and robust economic development. The country's ambitious renewable energy targets provide an opportunity to create a more equitable workforce while transitioning to a low-carbon economy."

- Ms. Dipa Bagai, Country Head, National Resource Defence Council (NRDC) India

3. COE Highlights

- Complete **Real Industrial Physical Laboratory** with **Real Industrial Hardware and Software** with **Structured Industrial Curriculum** Courseware.
- Fully **Comprehensive** and **Illustrated** Textbooks/Lab guide, Instructor Guide Materials.
- **Physical Hands-on Experience, Installation, Training, Internship.**
- **Industry Expert as Mentors and Advisors and Real Case.**
- **Full support in preparing the students to be job-ready**.

4. COE Highlights

Benefits of AIIPL-MARCRAFT Approach

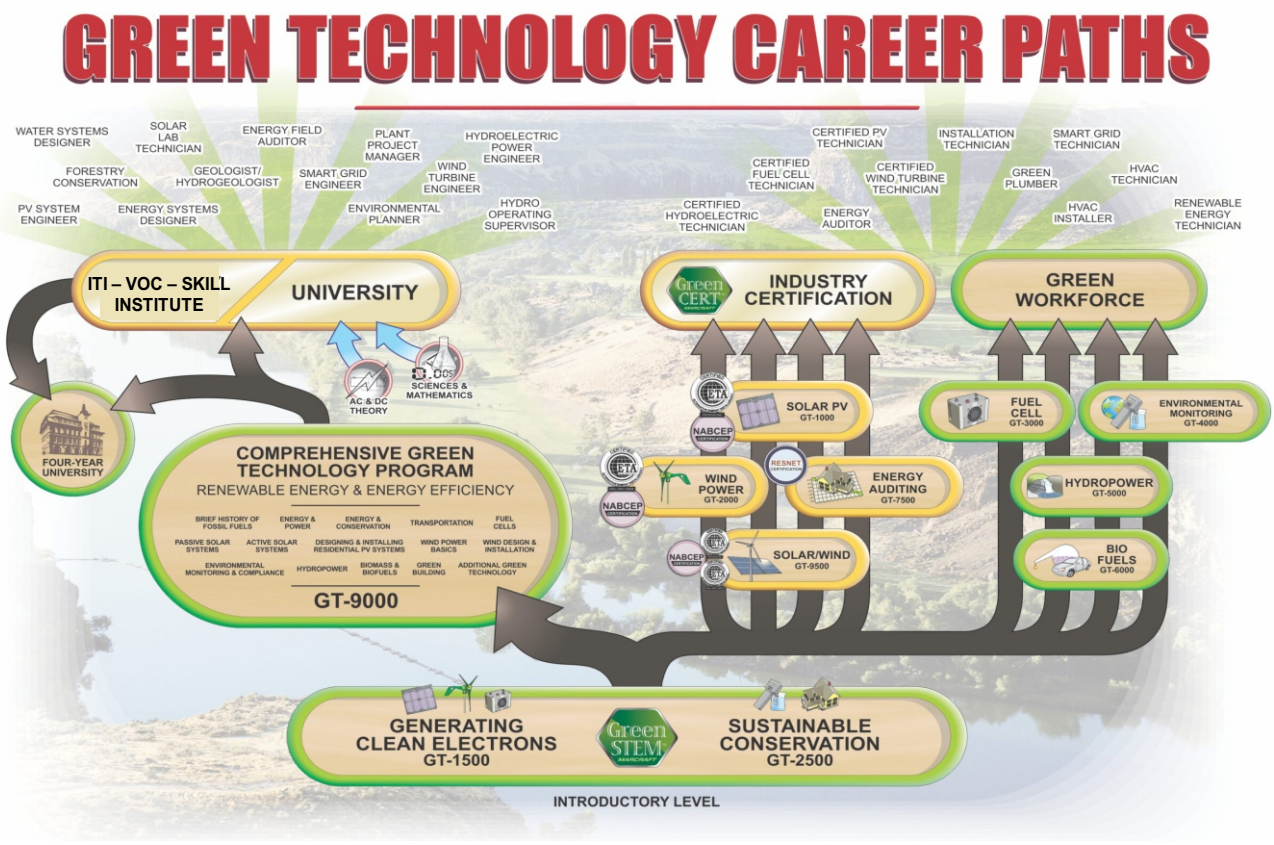
FULLY STRUCTURED GREEN ENERGY TRAINING

PROGRAM IN REAL INDUSTRIAL ENVIRONMENT

USING EXPERIENTIAL LEARNING WITH

PHYSICAL HANDS-ON TRAINING

> Implement Mandate to Meet Industry Needs <
> Enrich Content with High Quality Content and Current Technology <
> Have Ability to Monitor of Progress of Students <
> Have Immediate Access to International Industry-Based Standards & Certifications <
> Supports Individualized Learning (Competency-Based) <
> Builds Problem Solving Skills and Delivers Employable Skills <
> Consistent Delivery of Standardized Industry Developed Quality Curriculum <
> Troubleshooting Skills <
> Industrial Simulation in Controlled Environment <
> Complete Solution (Hardware & Curriculum) <
> Instructor Training – "Train the Trainer" <



MARCRAFT GREEN TECHNOLOGY

GENERATING CLEAN ELECTRONS
GT-1500

The GT-1500 Clean Electron Generation course provides students an introductory, hands-on, interactive experience with the three leading sources of alternative energy generation technologies: Wind Power, Solar Power, and Fuel Cells. Upon completion, students will confidently be able to identify the individual components of each power generation approach and articulate their function and contribution to the overall process. Will prepare students for full-scale programs ahead.

Real World Hands-on Labs!

Not Just a Simulation! Hands-on Labs Use the Following Equipment:
- Photovoltaic Panels
- Wind Turbines
- Diversion Load Controllers
- Battery Storage System
- Electrolyzers
- Fuel Cells
- Inverters
- Control Panel Meters, Switches, & Fuses
- Multimeters

The Marcraft Generating Clean Electrons Course covers these topics:

Wind Power
- Installing and Testing a Wind Turbine
- Configuring and Testing Off-Grid Installations
- Design and Create a Wind Turbine Power System

Solar Power
- Installing, Combining, and Testing Solar Panels
- Configuring and Testing Off-Grid Installations
- Design and Create a Solar Charging System for Portable Hand-Held Devices

Fuel Cells
- Connecting a Fuel Cell for Electrical Generation
- Configuring and Testing Off-grid Installations
- Combining Wind and Solar Power Systems
- Configuring and Testing Combined Alternative Energy Systems for Off-Grid Operations

AND MUCH MORE!

INCLUDES:

GT-1500	Clean Electron Generation Panel
GT-150IG	Instructor's Guide with PowerPoint Presentation Media (1 Per Classroom)

ACCESSORIES:

GT-150	Generating Clean Electrons Text/Lab Guide
GT-15T	GREENSTEM Toolkit for the GT-1500
GT-15C	GREENSTEM Consumable Kit for the GT-1500
GT-150SC	SCADA Package

MARCRAFT GREEN TECHNOLOGY

SUSTAINABLE CONSERVATION
GT-2500

The GT-2500 Sustainable Conservation Technology Panel provides students an introductory hands-on interactive experience with multiple energy design, monitoring and auditing processes and technologies. As important as generating power and energy can be, it is equally important to understand how we can conserve and improve upon our current processes. With identification and analysis techniques learned throughout the course, students will understand how new techniques such as LEED design are improving the efficiency of our energy usage.

Real World Hands-on Labs!

Not Just a Simulation! Hands-on Labs Use the Following Equipment:
- Passive Solar Water Heaters
- Data Loggers
- Temperature Sensors
- Wind Speed Sensors
- Sound Sensors
- Light Sensors
- Humidity Sensors
- Ph Sensors
- Dissolved Oxygen Sensors
- Computer Aided Drafting & Design Software

The Marcraft Sustainable Conservation Course covers these topics:

Energy Auditing
- Measuring Electrical Consumption of Devices
- Calculating Electrical Loads
- Implementing Power Saving Options
- Evaluating Insulation Values

Environmental Monitoring
- Gathering Data with Portable Datalogger
- Evaluating Soil and Water as Insulation
- Charting Temperature Changes Throughout a Structure with Different Insulation and Heating Conditions

Sustainable Architecture
- Structural Building Components' Affect on Energy Consumption
- Planning Sustainable Buildings
- Passive Solar Lighting and Heating Techniques
- LEEDS Standards

AND MUCH MORE!

INCLUDES:

GT-2500	Sustainable Conservation Technology Panel (Requires PC Workstation Computers)
GT-250IG	Instructor's Guide with PowerPoint Presentation Media (1 Per Classroom)

ACCESSORIES:

GT-250	Sustainable Conservation Text/Lab Guide
GT-250SC	SCADA Package

MARCRAFT GREEN TECHNOLOGY

SOLAR PHOTOVOLTAIC INSTALLER CERTIFICATION PROGRAM
GT-1000

According to the 2017 US Energy and Employment Report, more people now work in the US solar industry than in oil, natural gas, and coal extraction - combined. A recent study by The Solar Foundation (TSF) study shows that solar jobs are growing at a rate 10 times the national average.

The Solar PV Technology Training Panel allows instructors to teach every aspect of solar power to their students. From installation, to configuration, to AC and DC conversion, students can learn how each of the features of solar power work together. Using the NABCEP and ETA certifications as guiding principles, students will gain valuable knowledge and experience in topics such as solar resources and principles; selection identification; proper installation sequence, performance characteristics and troubleshooting methods; permitting best safety practices; and economic impact.

CERTIFICATIONS:

ETA Photovoltaic Installer Level 1

NABCEP Exam

Not Just a Simulation! Hands-on Labs Use the Following Equipment:
- Photovoltaic Panels
- Load Diverters
- Inverters
- Battery Storage System
- Control Panel Meters, Switches, & Fuses
- Multimeters

The Marcraft Solar Photovoltaic Installer Certification Course covers these topics:
- Energy and Power
- Passive Solar Systems
- Active Solar Systems
- Troubleshooting PV Systems
- Building Codes and Compliance
- Understanding Blueprints
- Design & Installation of Residential Scale Photovoltaic Systems

AND MUCH MORE!

Real World Hands-on Labs!

INCLUDES:	
GT-1000	Solar PV Technology Panel
GT-100IG	Instructor's Guide with PowerPoint Presentation Media (1 Per Classroom)

ACCESSORIES:	
GT-100	Solar PV Text/Lab Guide
GT-10T	Solar Panel Tool Kit
GT-10C	Solar Panel Consumable Set
GT-100SC	SCADA Package

MARCRAFT GREEN TECHNOLOGY

SOLAR/WIND ENERGY CERTIFICATION PROGRAM
GT-9500

Best of Two Worlds! Combine solar and wind technology into one comprehensive learning environment focusing on the best in new green technologies. The best of the GT-1000 and GT-2000 in one panel and one curriculum.

CERTIFICATIONS:

ETA Photovoltaic Installer - Level 1

ETA Small Wind Turbine Installer - Level 1

NABCEP Exam

Not Just a Simulation! Hands-on Labs Use the Following Equipment:
- Solar Photovoltaic Panels
- Wind Turbines
- Diversion Load Controllers
- Battery Storage System
- Inverters
- Control Panel Meters, Switches, & Fuses
- Multimeters

The Marcraft Solar/Wind Installer Certification Course covers these topics:
- Energy and Power
- Passive Solar Systems
- Active Solar Systems
- Troubleshooting PV Systems
- Wind Power Technology
- Wind Turbine Design
- Troubleshooting Wind Turbine Systems
- Building Codes and Compliance
- Understanding Blueprints
- Design & Installation of Residential Scale Photovoltaic Systems
- Design & Installation of Residential Scale Wind Turbine Systems

AND MUCH MORE!

Real World Hands-on Labs!

INCLUDES:	
GT-9500	Solar/Wind Energy Training System
GT-100IG	Solar PV Installer Instructor's Guide with PowerPoint Presentation Media (1 Per Classroom)
GT-200IG	Wind Turbine Installer Instructor's Guide with PowerPoint Presentation Media (1 Per Classroom)

ACCESSORIES:	
GT-100	Solar PV Text/Lab Guide
GT-200	Wind Turbine Text/Lab Guide
GT-10T	Solar Panel Tool Kit
GT-10C	Solar Panel Consumable Set
GT-20T	Wind Panel Tool Kit
GT-20C	Wind Panel Consumable Set
GT-2000AC	Advanced Controls Hardware
GT-950SC	SCADA Package

MARCRAFT GREEN TECHNOLOGY

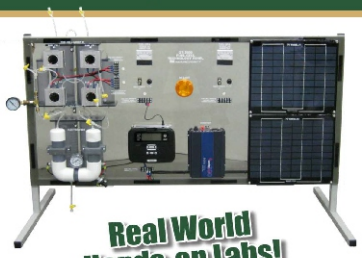
FUEL CELL TRAINING PROGRAM
GT-3000

The Marcraft Fuel Cell Technology training program is designed to provide students with a comprehensive understanding of fuel cell technology. The program covers the fundamentals of fuel cell systems, including their construction, operation, and maintenance. Students will gain experience working with data acquisition software, graphing and scientific calculators, mechanical drawings and digital multimeters. A Fuel Cell Technician may work in transportation or portable and stationary applications.

Not Just a Simulation! Hands-on Labs Use the Following Equipment:
- Photovoltaic Panels
- Electrolyzers
- Fuel Cells
- Inverters
- Control Panel Meters, Switches, & Fuses
- Multimeters

The Marcraft Fuel Cell Training Course covers these topics:
- History of Fossil Fuels
- Environmental Concerns
- Electric Grid
- Alternative Energy Sources
- Types of Energy
- Potential and Kinetic Energy
- Voltage and Current
- Electrical Loads
- Electrical Power Consumption
- Power Math
- Making Electrical Connections
- History of Fuel Cells
- Hydrogen Production, Storage and Transportation
- Types of Fuel Cells
- How Fuel Cells Work
- Fuel Cell Systems
- Future of Fuel Cells

AND MUCH MORE!



Real World Hands-on Labs!

INCLUDES:	
GT-3000	Fuel Cell Technology Panel
GT-300IG	Instructor's Guide with PowerPoint Presentation Media (1 Per Classroom)

ACCESSORIES:	
GT-300	Fuel Cells Text/Lab Guide
GT-30T	Fuel Cell Panel Tool Kit
GT-30C	Fuel Cell Panel Consumable Set
GT-300SC	SCADA Package

MARCRAFT GREEN TECHNOLOGY

HYDROPOWER TRAINING PROGRAM
GT-5000

Marcraft's Hydropower training panel will ensure individuals are trained in all aspects of the operation and maintenance of a hydro generation plant, as well as flow control of the river system and tributaries. They will confidently be able to monitor equipment conditions and performance, accomplish preventive and minor maintenance routines, and conduct process control and failure analyses. Students will operate plant equipment such as turbines, pumps, valves, gates, fans, electric control boards, and battery banks.

Not Just a Simulation! Hands-on Labs Use the Following Equipment:
- Multimeters
- Motors and Gears
- Water Wheels
- Control Panel Meters, Switches, & Fuses
- Flow Meters

The Marcraft Hydropower Training Course covers these topics:
- Types of Energy
- Potential and Kinetic Energy
- Voltage and Current
- Electrical Loads
- Electrical Power Consumption
- Power Math
- Making Electrical Connections
- History of Hydropower
- Hydropower Terms
- Measuring Head and Flow
- Microhydropower Systems
- Turbines
- Maintenance
- Economics of Microhydropower

AND MUCH MORE!

Real World Hands-on Labs!

INCLUDES:	
GT-5000	Hydropower Technology Panel
GT-500IG	Instructor's Guide with PowerPoint Presentation Media (1 Per Classroom)

ACCESSORIES:	
GT-500	Hydropower Text/Lab Guide
GT-500SC	SCADA Package

MARCRAFT GREEN TECHNOLOGY

BIOFUELS TRAINING PROGRAM
GT-6000

Marcraft Biofuels Training Program is designed to provide students with a comprehensive understanding of biofuel technology. Within the GT-6000 training panel, students will understand the various ways of making biofuels including chemical reactions, fermentation, and heat to break down the starches, sugars, and other molecules in plants. The resulting products are then refined to produce a fuel that cars or other vehicles can utilize for power. In this program, students will work with and understand a variety of fuel sources including corn, sugarcane, soybeans and other plants that are used to produce biofuels.

Real World Hands-on Labs!

Not Just a Simulation! Hands-on Labs Use the Following Equipment:
- Stills
- Hydrometers
- Biodiesel Production Equipment
- Biofuel-Powered Radio Controlled Truck

The Marcraft Biofuels Training Course covers these topics:
- Types of Energy
- Potential and Kinetic Energy
- Power Math
- Transportation Fuels
- Biomass and Biofuels Basics
- Types of Energy Produced
- Pyrolysis
- Gasification
- Anaerobic Digestion
- Ethanol, Biodiesel & Green Diesel
- Limitations to Overcome
- Wood Gas Generators
- Backyard Ethanol
- Backyard Biodiesel
- Safety and Quality Control
- By-product Management

AND MUCH MORE!

INCLUDES:

GT-6000	Biofuel Technology Panel
GT-6080	Biofuels-Powered Radio Controlled Truck
GT-600IG	Instructor's Guide with PowerPoint Presentation Media (1 Per Classroom)

ACCESSORIES:

GT-600	Bio-Fuels Text/Lab Guide
GT-60C	Bio-Fuels Consumable Set
GT-600SC	SCADA Package

MARCRAFT GREEN TECHNOLOGY

ENERGY AUDITING CERTIFICATION
GT-7500

Establish working knowledge of standard energy auditing practices and LEED certification standards. Be able to calculate the energy efficiencies of lighting as well as evaluate the climate control capabilities of structural designs and insulation materials. Effectively use current technologies available including infrared cameras for evaluation of both residential and commercial buildings.

CERTIFICATIONS:

RCSNET Home Energy Rater Certification

Real World Hands-on Labs!

Not Just a Simulation! Hands-on Labs Use the Following Equipment:
- Model House with Heating System
- Infrared Camera
- Passive Heating System
- Different Insulation
- Different Types of Light Bulbs

The Marcraft Energy Auditing Certification Course covers these topics:
- Sustainable Architecture
- Residential and Commercial Structures
- Energy and Power
- Energy Audits
- Insulation, Windows, and Ventilation
- Lighting
- Hot Water Heaters
- Passive Solar Systems
- Green Design Considerations
- Building Codes and Compliance
- Understanding Blueprints

AND MUCH MORE!

INCLUDES:

GT-7500	Energy Auditing Technology Panel (Requires PC Workstation Computers)
GT-7510	IR Camera
GT-750IG	Instructor's Guide with PowerPoint Presentation Media (1 Per Classroom)

ACCESSORIES:

GT-750	Energy Auditing Text/Lab Guide
GT-750SC	SCADA Package

MARCRAFT GREEN TECHNOLOGY

ENVIRONMENTAL MONITORING
GT-4000

The Environmental Monitoring (EM) Training Program enables students to study the human effect on our environment. Hands-on labs introduce students to data loggers, sensors, and lab equipment to perform the necessary tests on air and water to establish quality, identify heavy metals, eliminate noise pollution, and filter out light and UV radiation, to name a few. EM technicians provide critical data for environmental scientists and specialists.

Real World Hands-on Labs!

Not Just a Simulation! Hands-on Labs Use the Following Equipment:
- Data Loggers
- Temperature Sensors
- Wind Speed Sensors
- Sound Sensors
- Light Sensors
- Humidity Sensors
- pH Sensors
- Dissolved Oxygen Sensors
- Carbon Dioxide Sensors

The Marcraft Environmental Monitoring Course covers these topics:
- Monitoring Air Quality
- Radon Gas
- Carbon Monoxide and Combustible Gases
- Carbon dioxide
- Volatile Organic Compounds
- Airborne Lead
- Asbestos
- Monitoring Water Quality
- Radon in Water
- Heavy Metals
- Pesticides
- Environmental pH Water Assessments
- Sound and Noise Pollution
- Light and UV Radiation
- Environmental pH Soil Sampling
- Lead Pollution in Soil

AND MUCH MORE!

INCLUDES:

GT-4000	Environmental Monitoring Technology Module (Requires PC Workstation Computers)
GT-400IG	Instructor's Guide with PowerPoint Presentation Media (1 Per Classroom)

ACCESSORIES:

GT-400	Environmental Monitoring Text/Lab Guide
GT-40C	Environmental Monitoring Consumable Set

MARCRAFT GREEN TECHNOLOGY

GREEN TECHNOLOGY CONCEPTS AND PRACTICES
GT-900T

This Marcraft GreenSTEM Training Guide sets the stage introducing the principles that led us to the quest for rapid expansion of green technologies - the worldwide energy crisis, global warming, rapidly expanding middle classes around the world, diminishing worldwide resources, and global power economics. In subsequent chapters, basic electrical principles are covered along with the theory of each major green technology, which is covered in detail. In each case, you will learn the underlying science of the technology, the application of the science to these technologies, math principles associated with the technology as well as engineering and design principles required to implement and scale the technology.

The Marcraft Green Technology Concepts and Practices Text Book covers these topics:
- Solar (Photovoltaic) Power (Design and Installation)
- Solar Thermal (Solar Hot Water)
- Small Wind Power (Design and Installation)
- Fuel Cell Technology
- Biofuels (Ethanol and Biodiesel) and Biomass
- Micro-Hydro Power Systems
- Energy Conservation Techniques
- Energy Auditing
- Green Building Concepts
- Transportation Issues
- Environmental Compliance and Monitoring
- Ocean Energy, Geothermal Energy, and Nuclear Energy

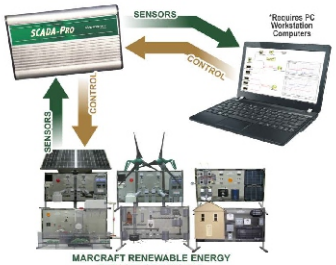
AND MUCH MORE!

INCLUDES:

GT-900T	Green Technology Concepts & Practices Text Book

SCADA
SC-1000

SCADA (Supervisory Controls And Data Acquisition) systems are comprised of both hardware and software used to control processes as well as acquire all necessary data needed for future analysis, from one location. This functionality can be added to all Marcraft Green Technologies Panels and/or Programs with the exception of the GT-4000 trainer. By attaching the SCADA-Pro interface and sensors to the back of the panel, a computer can then be connected to the SCADA-Pro interface. Using the provided software, students can monitor multiple measurements in real time.



Sensor Types:
- DC Current
- DC Voltage
- AC Current
- AC Voltage
- Temperature
- Pressure
- RPM
- Flow Rate

Data Acquisition & Control Buildable Systems:
- On/Off
- Digital Logic
- Proportional
- Derivatives
- Integral Controls
- Combinations

AVAILABLE ON THESE PANELS:

GT-100SC	SCADA for the GT-1000
GT-150SC	SCADA for the GT-1500
GT-200SC	SCADA for the GT-2000
GT-250SC	SCADA for the GT-2500
GT-300SC	SCADA for the GT-3000
GT-500SC	SCADA for the GT-5000
GT-600SC	SCADA for the GT-6000
GT-750SC	SCADA for the GT-7500
GT-950SC	SCADA for the GT-9500

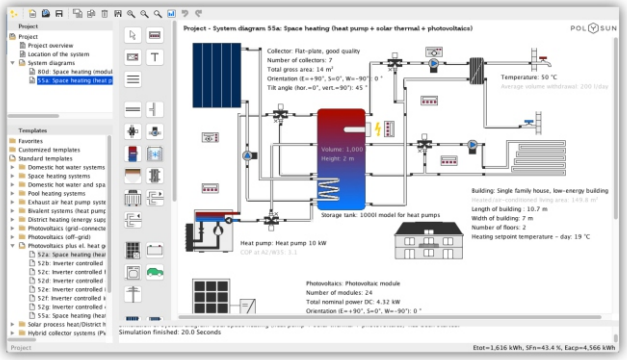
POLYSUN®

SOLAR SYSTEM SIMULATIONS WITH PRECISION

Polysun is a software that enables users to effectively simulate solar-thermal, photovoltaic and geothermal systems.

With the Polysun software from Vela Solaris you can rely on a multi-practice simulation of your energy system with reliable results in terms of functionality, energy efficiency and profitability – from single-family homes to districts, worldwide and for all market-standard technologies.

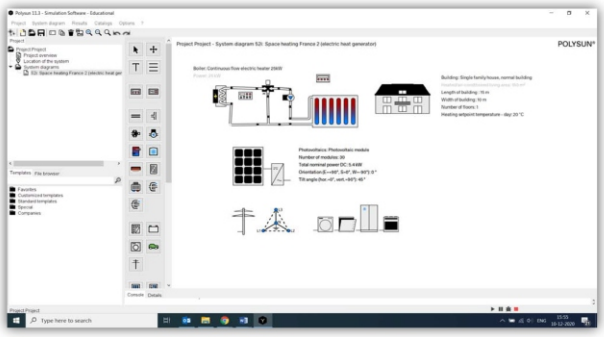
Polysun is the only commercial simulation software for renewable energy systems which allows you to combine different technologies with each other (solar thermal, PVT, photovoltaics, heat pumps, ground-source loops, cogeneration units etc.) and the only software which allows you to edit the system templates and to create your own ones. This is the most important point. Compared to other academic software, thanks to its clear depiction of the systems and its modularity it is much easier to use and therefore particularly suitable for teaching. Students can learn quickly how to use it and get a good overview of the market thanks to the rich databases.



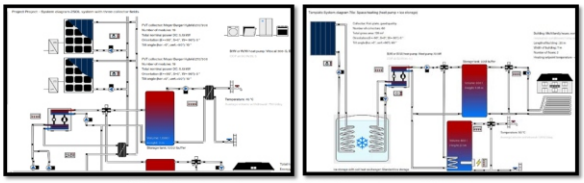
POLYSUN DESIGNER

Polysun Designer depicts your energy system at an early planning stage. Systems can be built up quickly and potential for optimization revealed. This gives you planning security and convinces your customers with sophisticated and economical energy concepts. Polysun Designer intelligently combines applications to meet heating, cooling, electricity, and electromobility requirements.

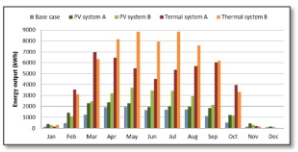
Using simple drag-and-drop you can choose from 150,000 system components that are always up-to-date and simulate the interaction of the energy system in dynamic time steps up to a resolution of steps in seconds. You can define intelligent control logic in a completely flexible manner, thereby additionally increasing the energy and cost efficiency of your solution.



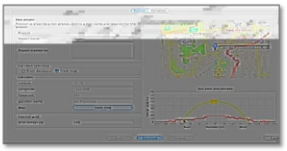
- *Free and easy programming of control logics*
- *More than 150,000 deposited energy system components*
- *1,000 practice-tested templates for energy system concepts*
- *Simulation of every market-standard technology – worldwide*
- *Energetic monthly and annual balance sheets*
- *Technical result reports and profitability calculation*



1000's of Readymade Templates for Solar Photovoltaics and Thermal



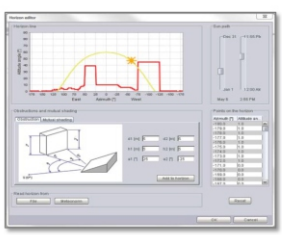
Compare Scenario Results



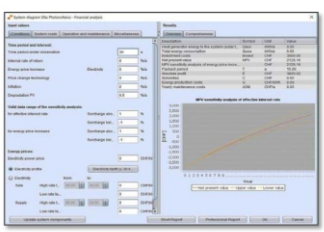
Sun and Shading data from Maps or Database

FEATURES

- Validated calculation models for solar thermal collectors, thermal tanks (water, ice and ground tanks), ground-source loops, conventional heat generators, biomass boilers, air-to-water, brine-to-water and water-to-water heat pumps, adsorption and absorption chillers, hybrid collectors (PVT), photovoltaic modules, inverters, batteries, cogeneration units, fuel cells and many more
- Hydraulic interconnections can be arranged at will
- Controlling strategies for the hydraulic systems can be freely defined
- Comprehensive product data bases of heat pumps, photovoltaic modules, inverters, batteries, solar collectors, cogeneration units and many more components
- Catalogs stored in the Cloud, no need to update your data bases
- Includes a selection of more than 1,000 pre-configured hydraulic templates (including company templates)
- Hydraulic templates for large-scale thermal systems, local, district heating and energy networks
- Import of thermal loads for process heat applications on an hourly or 15-minute-basis
- Integrated building model to calculate heating and cooling loads
- Interfaces to import the heating energy demand according to the German EnEV, the Swiss SIA etc.
- Automatic variation of parameters
- Reports that are accepted for diverse applications for subsidies
- Easy comparison of simulation results of several system diagrams
- Detailed evaluation of simulation results per time step, 15 min., hourly or monthly values
- Real time visualization using simulation analysis and graphic display of results
- Updated Meteonorm weather data delivered through a web service (worldwide)
- Comprehensive economic calculations including system comparison
- Coupling of thermal and electrical systems (Power to Heat)
- Calculation of own consumption based on entries of electric consumption profiles that are accurate down to one-minute-/five-minute-/fifteen-minute-time steps or hourly values
- Variable prices for energy from the grid and for feed-in-tariffs can be imported
- Off-grid systems and simulation of uninterrupted power supply systems
- Electromobility
- Easy to use, simple to handle



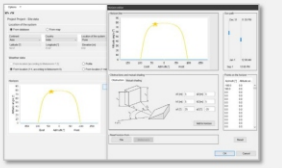
Structural Obstruction and Shading data



Quick and detailed Financial Analysis

USER INTERFACE AND FEATURES IN BRIEF

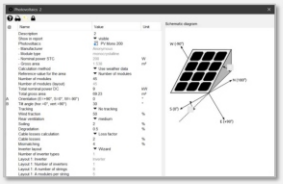
Wizards with Intelligent Filters



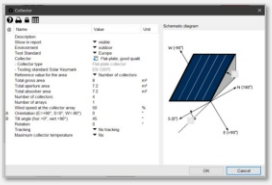
Horizon, Location, Obstruction Shading from Map or Database

Grid Detailing

Battery Definition



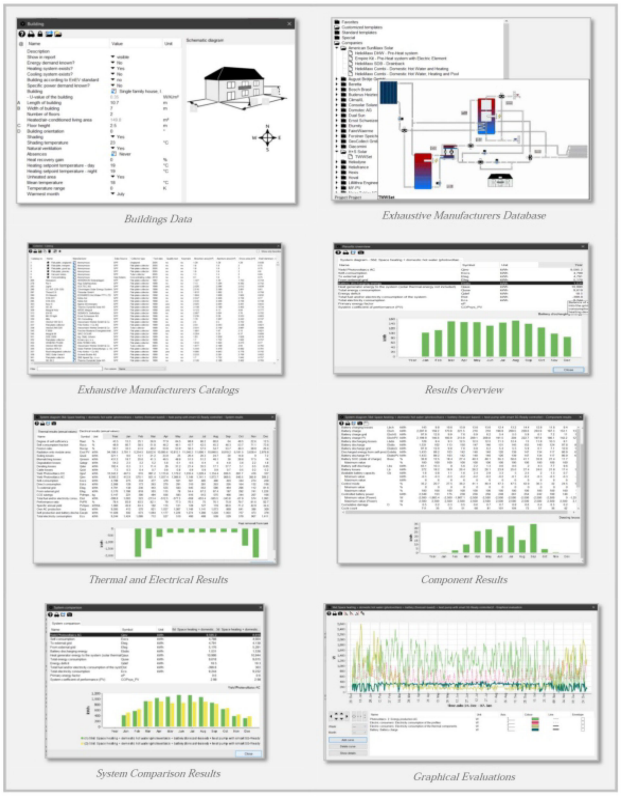
Detailed definition of Photovoltaics

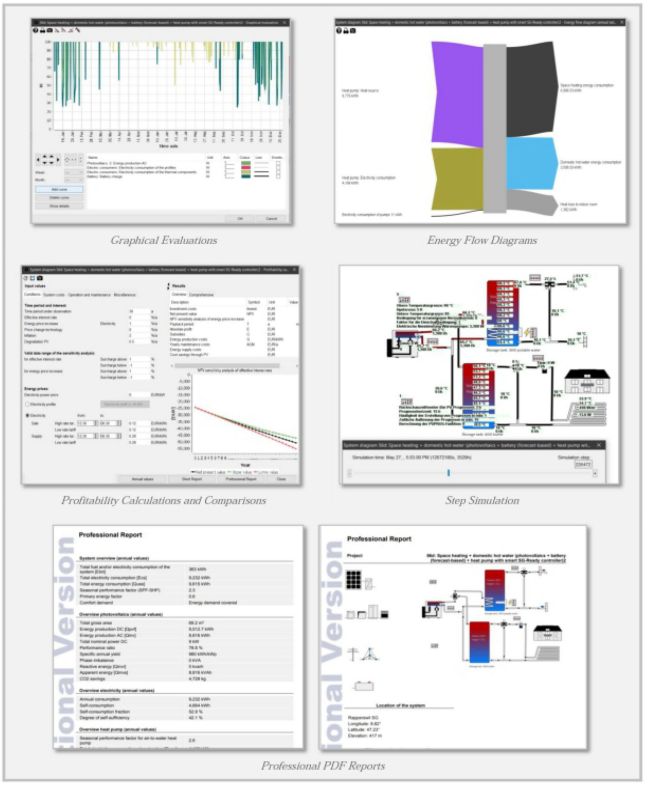


Detailed definition of Collectors

Heat Pump detailing

Water Tanks





FOR UNIVERSITIES

As a teacher, you want to equip students for practical work and enable them to develop digitally energy systems with a future. As a recognized and globally widely used simulation tool, Polysun is ideally suited for this purpose. A comprehensive database of market-standard components and tested energy system templates make it easy for students to get started – from the first simple exercises to challenging research questions. The effective design and sizing of energy systems for buildings and districts is tested and researched with Polysun. Knowledge is acquired and internalized in a playful way.

Practical teaching of content for digital energy system simulation

- Vela Solaris was founded as a spin-off of the renowned University of Applied Sciences in Rapperswil (Switzerland) and still has strong roots in science and research today.
- Universities value our high level of expertise and the uncomplicated support we provide to lecturers and students in the use of Polysun and in the craft of energy system simulation.
- By collaborating on real university research projects, Polysun always keeps its finger on the pulse of the latest innovations from the research departments. At the same time, Vela Solaris, as a partner, bridges the gap between research and the market: the latest energy components are always available to researchers in the Polysun library, enabling them to investigate innovative energy concepts.
- Students are already learning how to use simulation software used by renowned companies in their target market. In this way they are optimally prepared for later career entry.

Make lively, hands-on lessons easier

Easily create exercises for students
Practice sessions can be easily created in Polysun and results can be exchanged between teachers and students. We provide teachers with a wide range of practice examples, which we create using our many years of practical experience. With the purchase of our software this service is free of charge.

Training modules from our experts for students

The craft of digital energy system simulation – we at Vela Solaris have been experts in this field for decades. We are happy to impart this knowledge based on our Polysun software, from the introductory course to in-depth module. Vela Solaris accompanies students closely, uncomplicatedly, and flexibly in the form of webinars or on-site training. With Vela Solaris as a partner, the transfer of practical experience is effortless.

FOR BUILDING & DISTRICT PLANNERS

The most important thing when planning an energy system is that it works in practice and meets the requirements cost-effectively. This is a challenge, especially in view of the increasing regulatory requirements and sudden leaps in technology. This is where Polysun's great strength lies: the powerful computing core of our software maps your energy system realistically at an early planning stage, giving you planning security that wins over your customers – worldwide, for all market – standard technologies and across the sector boundaries between heating, cooling and electricity.

With Polysun, you can effortlessly run through your various planning ideas: based on characteristic curves from real test series, you simulate more than 150,000 components, the interaction of which you can test, compare and significantly optimize their interaction with just a few clicks on their energy efficiency and profitability over any length of time.

In short: Polysun offers you maximum flexibility in the representation of innovative energy systems. From ice storage to heating networks.

FOR MANUFACTURERS & DISTRIBUTORS

A great deal of expertise is required for successful consulting and the sale of energy components and systems. You want to convince customers with clear decision-making bases: What energy and economic added value does a particular component provide when integrated into an overall system? What overall solution can you recommend to customers?

With our Polysun software you can demonstrate the advantages of your solution using tried-and-tested simulation results. We support you with templates of working complete systems to meet the electricity, heating, and cooling requirements – exactly for your applications. With just a few clicks, you can tailor the templates to your respective project and integrate your own components. As an innovative solution provider, you convince your customers with clear decision-making bases and meaningful results reports for your offers.

Building and district planners worldwide use Polysun as a design tool. With your components in the Polysun database, you will be visible to your customers – for an even greater sales success. **Find out more.** Do you want to digitalize your sales activities and generate more leads for your products and systems at a reasonable price? Integrate Polysun into your website application and run your power system simulations in the cloud.

FOR ENERGY SERVICE PROVIDERS

As an energy service provider, you position yourself as a competent partner for energy systems with a future for smart and integral energy solutions.

Especially in the early planning phase, it is important to highlight ground-breaking energy solutions and all-round carefree solutions such as energy contracting. In the case of energy systems already installed, the question arises as to how energy costs can be reduced. In all these tasks, energy service providers supply valuable consulting and other services. We support you in identifying the best possible solution with precise and field-tested energy system simulations – from planning to operation. In the simulations calculated by Polysun the heating, cooling and electricity sectors grow together efficiently and intelligently, opening up new opportunities for your business.

ABOUT VELA SOLARIS

POLYSUN®

BY VELA SOLARIS

Vela Solaris accelerates the development of efficient energy concepts. With our Polysun software and services we enable digital simulation of energy systems, thus enabling targeted optimization of projects.
The Polysun software was developed in 1992 by the renowned Institute for Solar Technology (SPF) at the University of Applied Sciences in Rapperswil (Switzerland). Vela Solaris was founded as a spin-off in 2006. Since then we have continuously refined the simulation of energy systems and expanded it to include new energy production technologies.
We take care of our customers' concerns with passion and great expertise. Today, more than 1,000 recognized engineering companies, manufacturers and distributors of energy system components, energy service providers and universities rely on our software solutions and services worldwide.
Our daily work is characterized by the pursuit of a better solution, close communication with our customers and the commitment to accelerate the development of efficient, holistic energy systems.

POLYSUN SPT

Planning PV installations more economically and energy-efficiently

With Polysun SPT, you have a flexible tool for designing PV systems. You can easily select the roofs via Google Maps or upload your own roof plans and aerial photographs in various file formats. The simulation provides you with precise results based on a wide range of data, e.g. current Meteonorm data, roof orientation, roof shape, interference surfaces (e.g. skylights), partial shading elements due to nearby objects as well as power supply and feed-in tariffs.
Create snow and wind load calculations for different roofs in the same project and export detailed CAD roof plans and string plans for module assembly.
Convince your customers with automatic 3D visualizations of the buildings including terrain modelling, detailed graphical evaluations of the simulations in real time and comprehensive profitability assessment of the systems.

- *Roof selection from Google Maps and Bing*
- *Planning and simulation of several roofs in one project*
- *Automatic 3D visualisation of the buildings including terrain modelling*
- *Convenient self-consumption profile editor*
- *Cloud catalogues for update-free database maintenance*
- *No local installation required*

FEATURES

- Roof selection from Google Maps and Bing
- Upload of roof plans and aerial photos as jpg-, png-, gif- and bmp-files
- Design of the substructure on 7 different roof shapes
- East/west alignment or south alignment for flat roofs
- Planning and simulation of several roofs in one project
- Automatic 3D visualization of buildings, including terrain modeling
- Editing the horizon line manually
- Definition of interference areas (e.g. roof windows) and close shading elements (e.g. chimneys)
- Detailed analysis and visualization of close-up shading
- Snow load and wind load calculation
- Detailed CAD roof plans of the fastening points of the modules
- Automatic and manual inverter design
- Automatic and manual creation of string plans
- Validated calculation models for photovoltaic modules, inverters, batteries and self-consumption profiles
- Self-consumption profile editor
- Extensive product databases of photovoltaic modules, inverters and batteries
- Cloud catalogs for update free database maintenance
- Detailed evaluations on a monthly basis
- Real-time visualization using simulation analysis and graphical evaluation
- Meteonorm weather data
- Comprehensive economic analysis of the systems
- Input of power supply and feed-in tariffs
- Simple handling and clear user guidance

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