

New Energy Lab

Smart Grid for Training and Applied Research

NEW with

- API
- Tie Grid

OPTIONAL (on request)

- HG 198nl/h
- Solar Tracker

ACADEMIA OFFERING
RESEARCH SOLUTIONS



WIND



SOLAR



FUEL CELL



GRID



ELECTRONIC DC LOAD



HYDROGEN GENERATOR

Smart-Grid Training Laboratory for Experiments Related to Energy Management

- » Features up to 30 realistic experiments in new energy management for training and research purposes
- » Comes with new documentation, maintenance guidelines and spare part list
- » Includes software for uploading customer profiles with customized setups
- » Presents a weather data monitor system for recording the weather conditions

A complete laboratory for renewable energy for colleges, universities and research institutes

The New Energy Lab is a complete energy system that conveys practical knowledge in the field of energy management. The system combines renewable energy generation from solar, wind and fuel cell power with modern energy storage technology to create an autonomous hybrid system.

Optimized for the requirements of universities and vocational schools, the three forms of renewable energy (solar, wind and fuel cell) can be explored as a single process or at the level of an overall system. Students can set up an autonomous power supply and learn about the interrelationships of various aspects of power management by experimenting with the parameters of the system components. The public power supply grid can be used as a backup to simulate the combined use of renewable and conventional energy sources, such as a diesel generator.

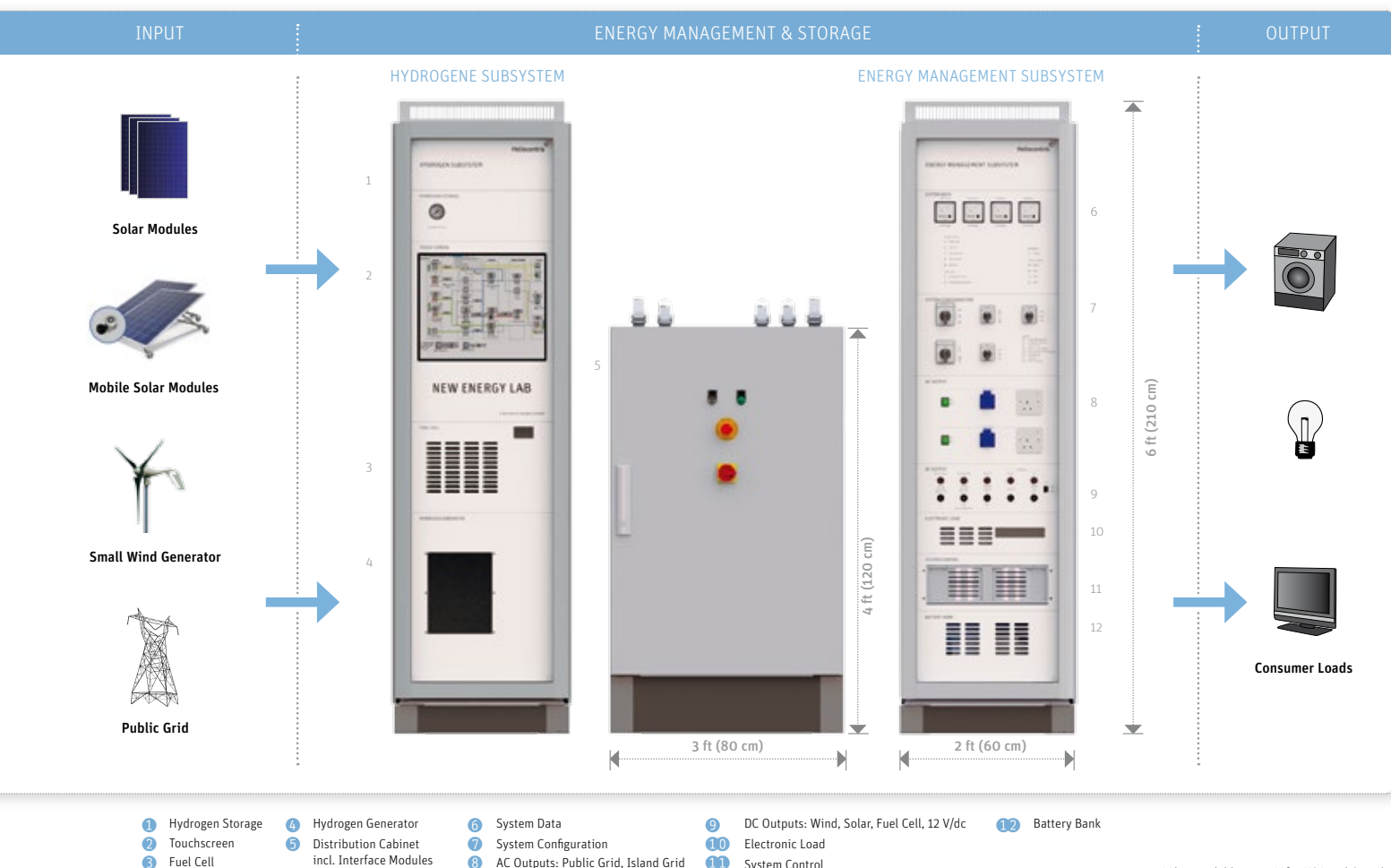
Extensive measuring technology with over 60 sensors, central monitoring and control software and an electronic load enable the recording of characteristic curves and system data.

Topics covered

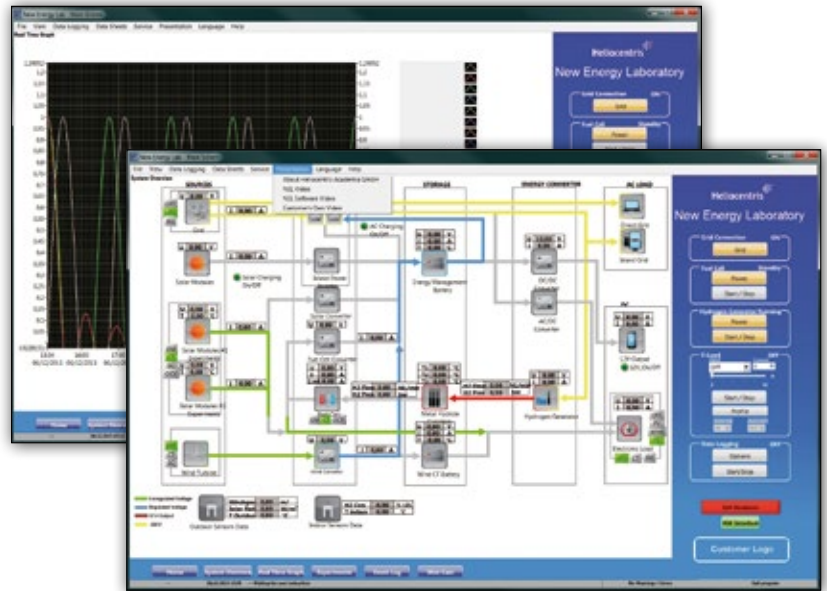
- » Renewable energy generation & energy management
- » Introduction to solar, wind, hydrogen and fuel cell technology
- » Design, set-up and operation of hybrid energy systems
- » Examination of renewable energy sources and energy storage technologies
- » Off-grid operation of consumer loads (230, 12V)*
- » Observation of the following scenarios: night-time operation, periods of no wind, peak loads

Service

The New Energy Lab from Heliocentris is offered as a turnkey solution. Service includes everything from consultation to installation and training of users.



The system is designed to run in different set-ups allowing to test electrical paths of different energy sources, e.g., solar module, wind generator or fuel cell in combination with a battery system and an electronic load.



Curriculum and Instructional Materials

- » Comprehensive curriculum for courses in engineering, sciences, environmental studies and business
- » Three renewable energy textbooks with basic and advanced knowledge
- » Includes experiments in the following training and research areas:
 - Solar and wind energy
 - Electrolyzers and fuel cells
 - Island grid mode
 - UPS system mode
 - Off-grid back-up mode

LabVIEW-based software

The central monitoring and control software allows the user to log and save data as well as analyzing the hardware. Data and system status can be shown online. In addition, energy flow such as current, voltage, hydrogen flow and other valuable data are visualized in real time.

“The New Energy Lab is an excellent, teaching system for the complex issues of tomorrow’s energy supply.”

TH Wildau University of Applied Sciences, 2013



Technical Data

Energy Components	
Solar panels	1500 Wp
Wind turbine	300 Wp
Fuel cell	1.2 kW
Hydrogen generator	72 sl/h, customised 198sl/h
Hydrogen storage canister	1500 sl
Battery	55 Ah @ 48V
Electronic load	2400 W

Measuring Technology and Data Recording	
Solar	
Solar radiation	
Module temperature	
No-load voltage	
Output power (current, voltage)	
Short circuit current	
Recording of U/I curve	
Recording of time curve (current, voltage, radiation, temperature)	
Wind	
Wind speed	
Output power (current, voltage)	
Recording of time curve (current, voltage, wind speed)	
Fuel Cell	
Hydrogen flow rate	
Hydrogen pressure	
No-load voltage	
Output power (current, voltage)	
Recording of U/I curve	
Measurement of time curve (current, voltage, H ₂ flow rate, H ₂ pressure)	
Hydrogen Generator	
Power consumption (current, voltage)	
Hydrogen flow rate	
Hydrogen pressure	
Battery	
Input power	
Output power	
Recording of time curve (current, voltage, temperature)	

Software
Monitoring
Data logging
Visualization of current in real time
Visualization of hydrogen flow rate in real time
Visualization of voltage in real time

System Safety
Hydrogen sensor
Power circuit breaker
Temperature monitoring
Smoke detector
Monitoring of hydrogen pressure

Hydrogen storage canister
Hydrogen pressure
Hydrogen temperature
Hydrogen flow rate

External loads
Power consumption
Voltage
Current



Heliocentris

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*Optional to the
 Mobile Solar Module,
 Solar Tracking System



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