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ADVANCED ENERGY 2011
NEW YORK STATE'S PREMIER CONFERENCE FOR ADVANCED ENERGY

Buffalo State College and University at Buffalo Smart Grid Laboratory

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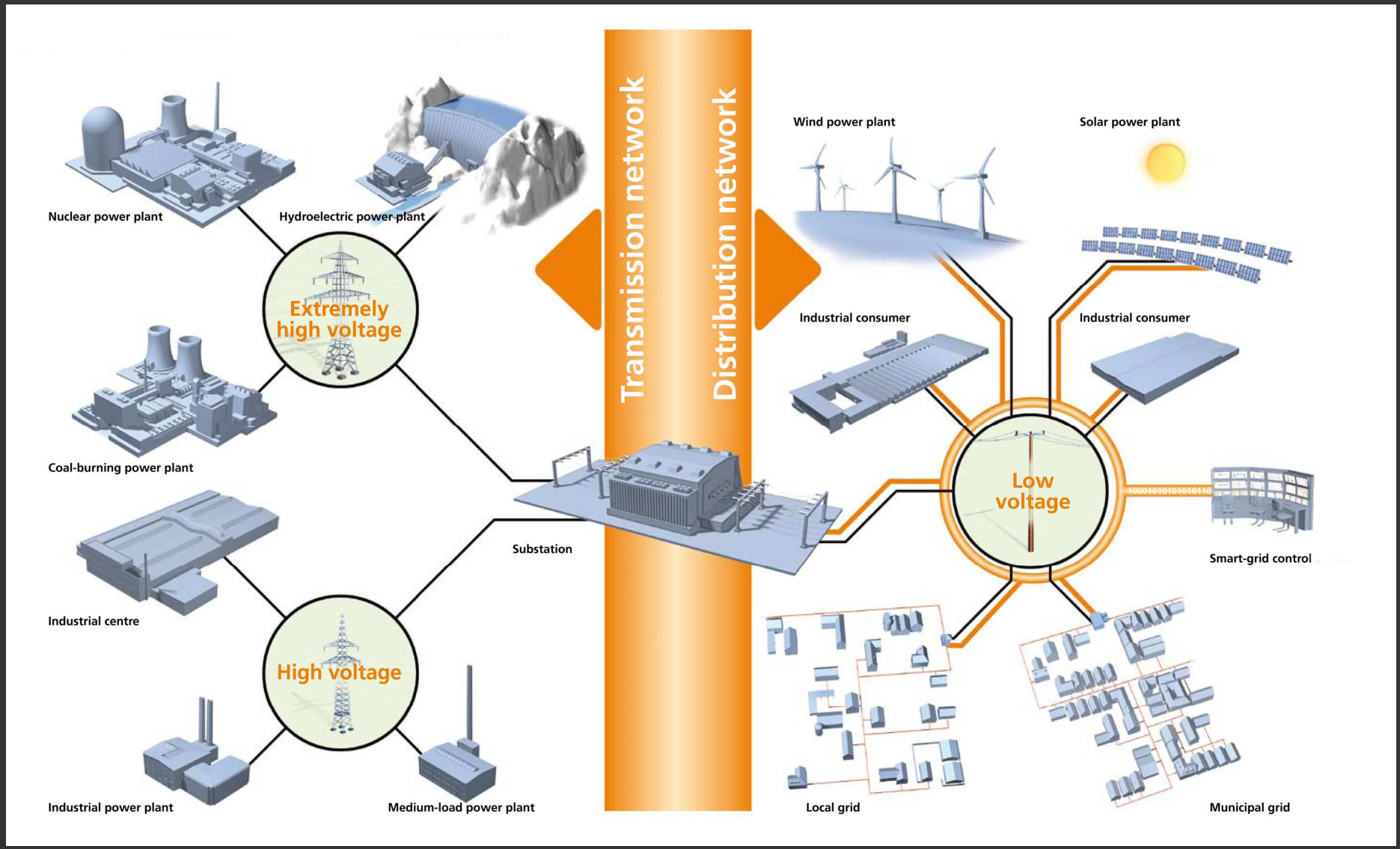
Energy Sector Focus

Participating Institutions
Syracuse University
Clarkson University
University of Rochester
University at Buffalo
Buffalo State College
Onondaga Community College

Smart Grid Workforce Training (DOE) FOA-0000152, Topic A, Subtopic: Strategic Training and Education in Power Systems (STEPS)

An instructional program that incorporates state-of-the-art smart grid technology, encompassing the various aspects of delivering electricity from the power plant to the consumer, including elements such as transmission line automation, distribution automation, substation monitoring devices, and Advanced Metering Infrastructure (AMI). Provides classroom and hands-on training for an assortment of power delivery personnel including line workers, electricians, technicians, engineers, planners, and operators.

Generation to Consumption



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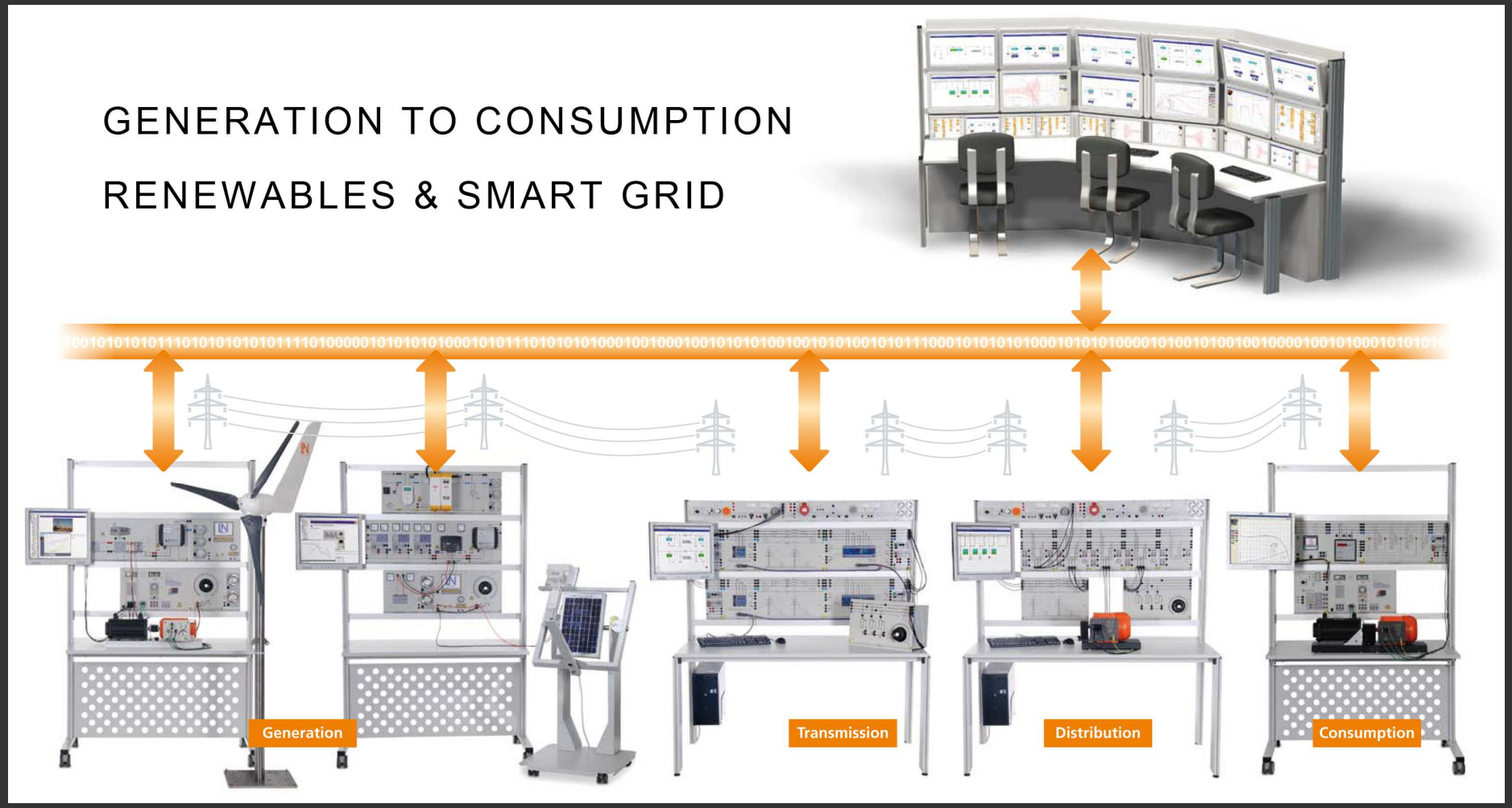
Scalable Solutions

GENERATION TO CONSUMPTION

RENEWABLES & SMART GRID



Energy Sector Content

- Electrical Fundamentals
- Generation – Synchronous Generators
- Generation – Renewable Power Plants
- Transformers
- Transmission Lines
- System Protection
- Distribution
- Consumption
- Energy Management
- Power Electronics

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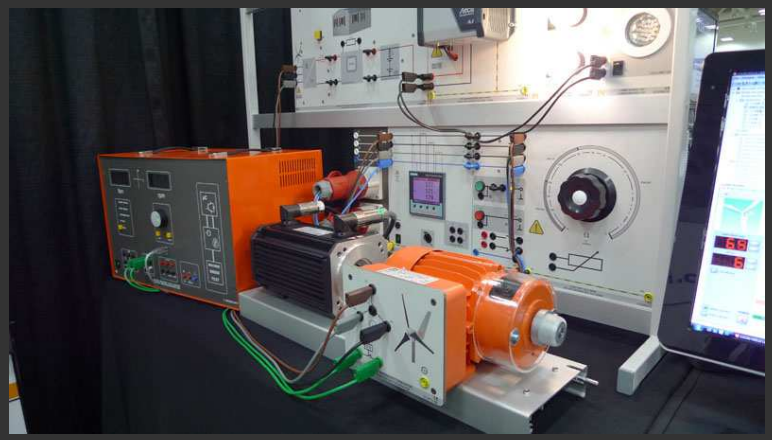
Electrical Fundamentals



- ✓ DC Circuits
- ✓ AC Circuits
- ✓ Three-phase Circuits
- ✓ Magnetism / Electromagnetism
- ✓ Electric Machines
- ✓ Power Electronics

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Electric Power Generation

- ✓ Synchronous Machines
- ✓ Asynchronous Machines
- ✓ Automatic Generator Control
- ✓ Synchronization
- ✓ Generator Protection

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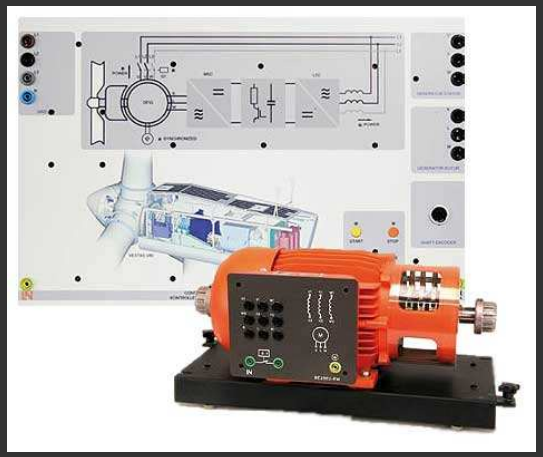
Renewable Generation

- ✓ Solar Photovoltaics
- ✓ Solar Collectors
- ✓ Wind Synchronous
- ✓ Wind Double Fed Asynchronous



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Transformers

Models, Connection Types, and Load Response

Multiphase Transformer Characteristics

Autotransformers

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Transmission Lines

Three-phase Transmission Lines

Parallel & Series Connection of Transmission Lines

Transmission Line with Ground-Fault Compensation

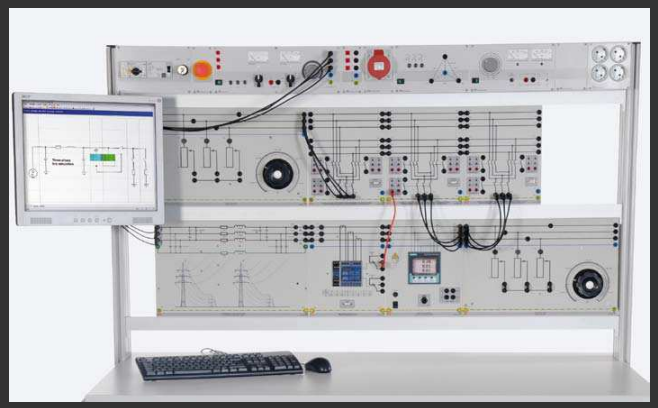
Transmission Systems with Synchronous Generator

Line Protection

System Protection

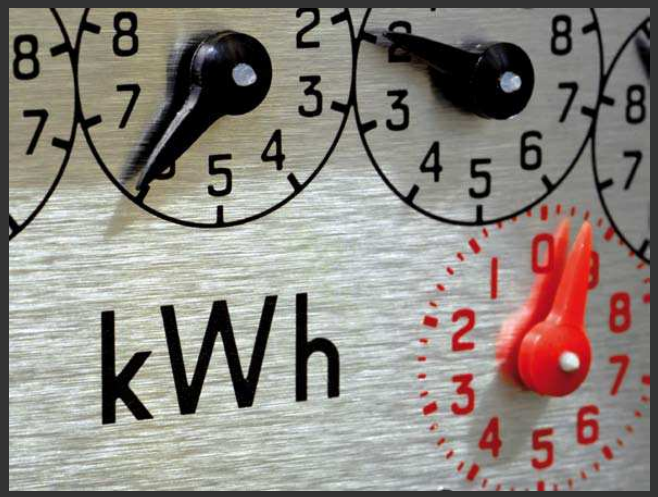
- Differential Protection
- High Speed Distance Protection
- Time Relay Characteristics & Applications
- Generator Protection

Power Distribution



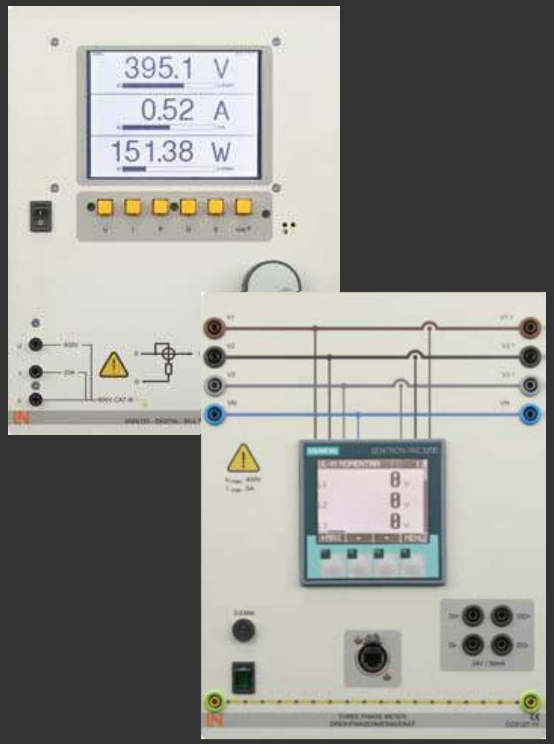
- Central Distribution
- Distribution Monitoring & Control SCADA
- Double Busbar Systems
- Incoming & Outgoing Feeders
- Switching Matrix
- Current Protection for Busbars
- Intelligent Networks

Energy Management



- Dynamic & Complex Loads
- Power Consumption Measurement
- Active & Reactive Energy Meters
- Manual & Automatic Compensation of Reactive Power
- Peak Load Monitoring & Control
- Motor Protection
- Preventive Maintenance

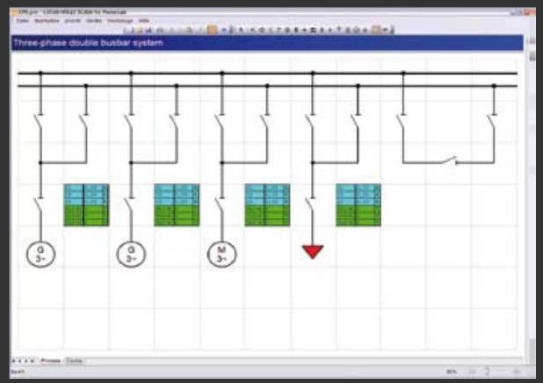
Smart Grid and SCADA

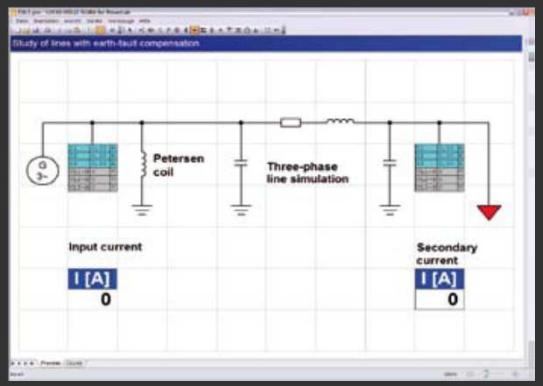


Intelligent Power Network = Smart Grid

“Smart” monitoring & control via
TCP/IP, RS485, USB

• SCADA Power-LAB software for the intelligent control and evaluation of the ”smart grid“





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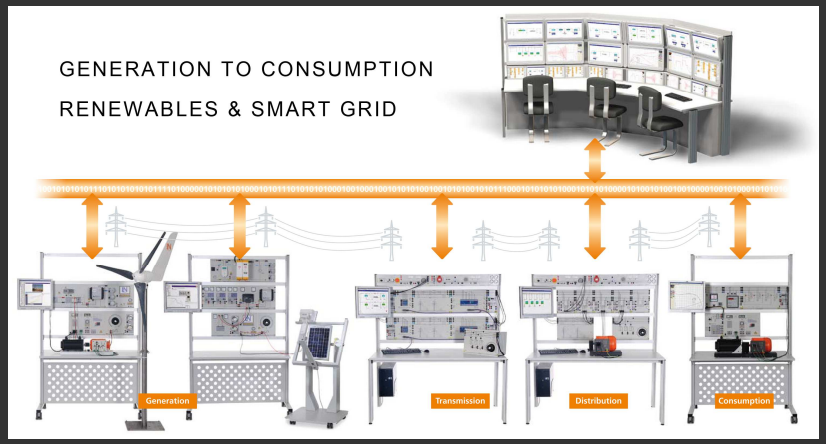
Power Lab

Contact Information



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