



ANNUAL INDUSTRY WORKSHOP
NOVEMBER 12-13, 2014

EDUCATION AND ENGAGEMENT

NOVEMBER, 12, 2014

JANA SEBESTIK

TCIPG EDUCATION

ASSISTANT DIRECTOR FOR STEM CURRICULUM DESIGN,
OFFICE FOR MATHEMATICS, SCIENCE, AND TECHNOLOGY EDUCATION

TCIPG universities

- Degree programs
- Internships
- TCIPG Reading Group
- Short courses
- Public engagement
- Application of research and knowledge



photo by L. Brian Stauffer

PRE-COLLEGE EFFORTS

- Power and Energy applets
- Apps for tablets
- TCIPG Minecraft World
- Hands-on kits
- Lesson plans
- Posters
- Trading cards
- TCIPG Education website
- Classrooms
- Camps
- Afterschool programs
- Professional meetings

K-12 TEACHERS AND STUDENTS

Developing the smart-grid
aware citizen of the future

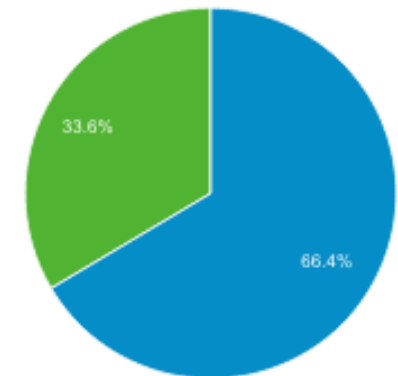
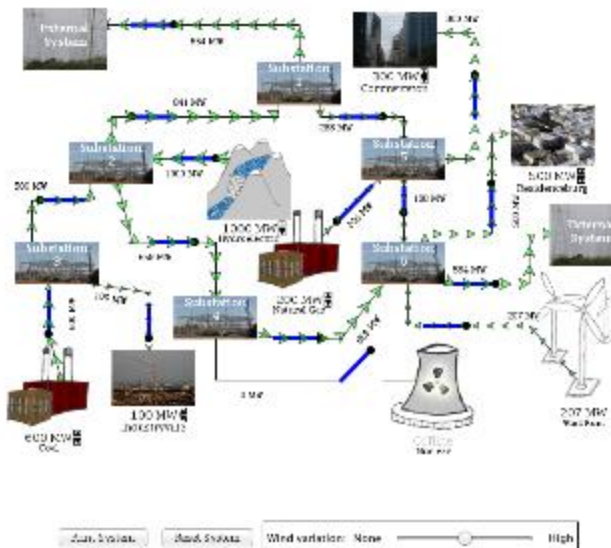
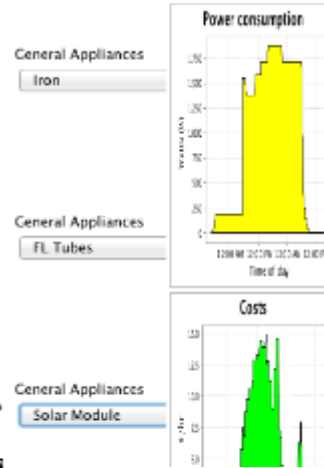
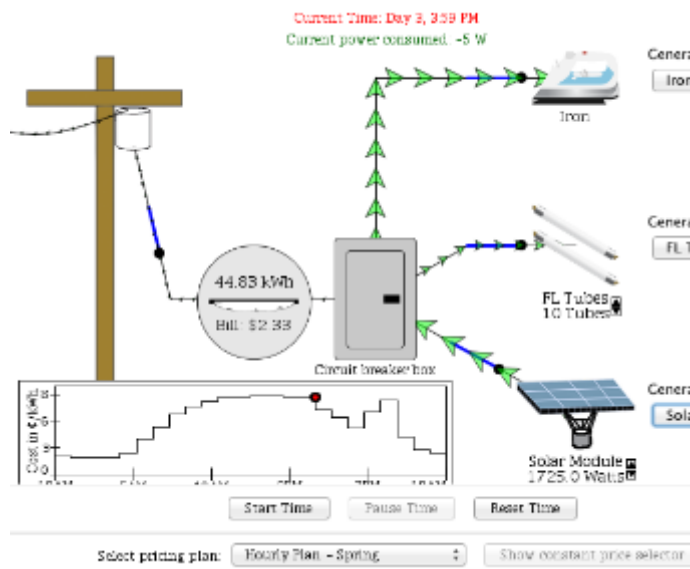
Encouraging interest in STEM
education and careers

Illustrating challenges,
trade-offs, and decisions
that go into power
system design and
operation

Teachers and families
learn too!



Power and Energy applets are continuing to evolve
Integrated into curriculum projects throughout the nation



Sessions	% Sessions
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over 155,000 sessions

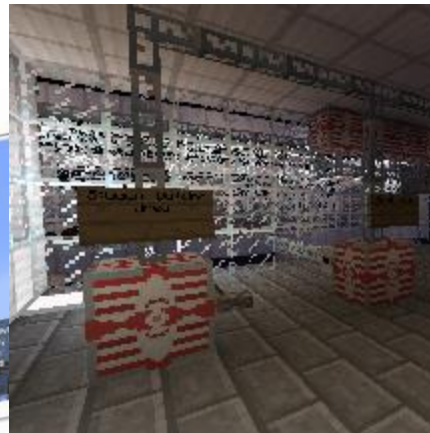


TCIPG MINECRAFT WORLD

where players can build and power a village

Learn about:

- Wind and solar power
- Nuclear and coal power
- Substation
- Sensors
- Smart switches
- Passive house design
- Password protection
- Home management systems



Preview video

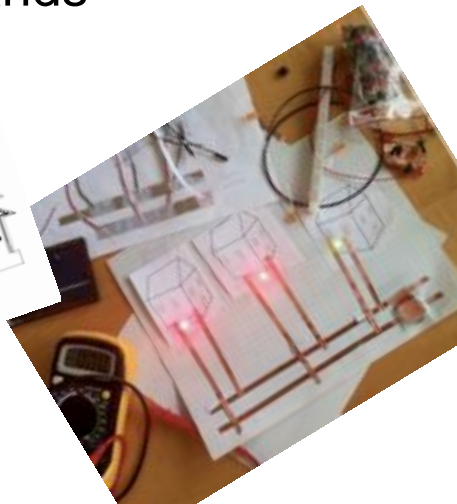
<http://tcipg.mste.illinois.edu/minecraft>

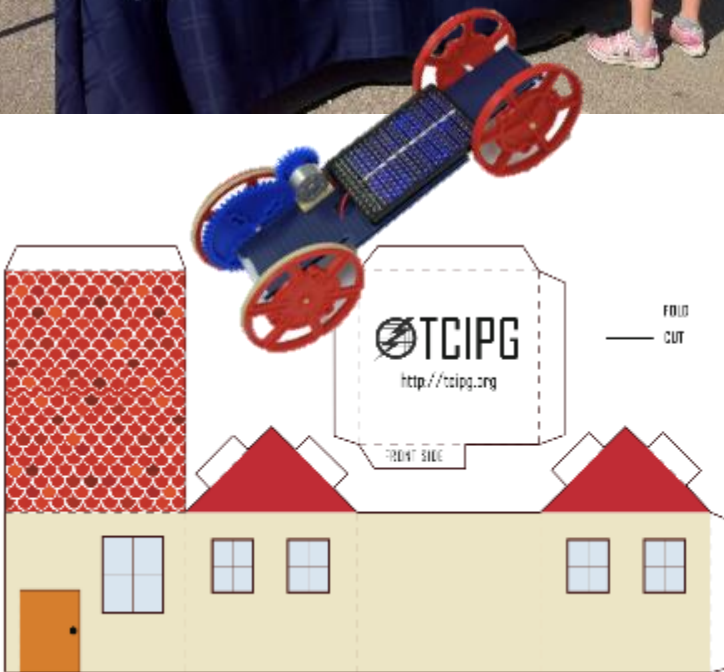
POWER PARK

No single correct way of playing
Many pieces
Sustained play
Gender-Neutral
Fun



Too often the fun has been removed from a toy by the time it gets to a child's hands





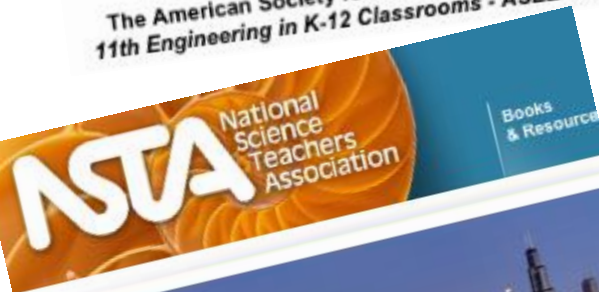
SUMMER LEARNING - TEACHERS AND STUDENTS

2014 K-12 Workshop

K-12 WORKSHOP
JOIN US FOR
ENGINEERING
IN K-12
CLASSROOMS —
ASEE ANNUAL
TEACHERS
WORKSHOP:



The American Society for Engineering Education (ASEE) is holding its
11th Engineering in K-12 Classrooms - ASEE Annual Teachers Workshop



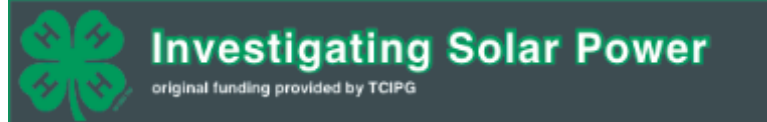
Conferences

National Conference in Chicago: March 12-15, 2015
Chicago: Great Lakes/Great Ideas



PARTNERSHIPS AND CONNECTIONS

- IEEE Science Kits for Libraries
- Questar-Bridges, a NYSERDA funded project, with Mesoscale Environmental Simulations and Operations Inc. (MESO Inc.)
- Southern Regional Education Board Advanced Career Energy and Power curriculum
- National 4-H SET
- Project Lead the Way
- KidWind



COMMUNITY

CONSUMER EDUCATION AND PUBLIC INFORMATION

Illinois State Fair Illinois
Energy Zone

Energy Education Council

Orpheum Children's
Science Museum

Engineering Open House

Urbana Science at the
Market at the Square

USA STEM Festival



ENGAGEMENT AND PUBLIC LEARNING

Families learn together

Publicize the importance of knowing about electricity production and delivery

Illustrate challenges, trade-offs and decisions that will come with the modernization of the electric grid

Communicate the importance of consumers as a smarter grid becomes a reality



OPPORTUNITIES FOR POWER AND CYBER PROFESSIONALS

1.5 DAY SHORT COURSES

Illinois Society of Professional Engineers

IEEE PES

DOE and DHS

TCIPG WEEK-LONG SUMMER SCHOOLS

CYBERSECURITY IN THE ELECTRIC SECTOR

Lectures, networking, and hands-on training

June 2013, June 2011, June 2008 with ~150 attendees at each

Next Summer School will be June 15-19, 2015

ANNUAL FALL INDUSTRY WORKSHOPS

Bringing Industry and Academia together

HANDS-ON SCADA SECURITY ASSESSMENT TRAINING

Recent News

17
JUNE

Security Assessment

TCIPGco has begun a security assessment to secure your future

10
JUNE

Summer Party

A kick off to a great summer season

3
MAY

Investor Meeting

TCIPGco is trying to expand, and meeting with investors

1
APRIL

Gotchal

No, this isn't the revolution, we still have power!

Welcome to Our Utility Company!

TCIPGco was formed to help you...



This website has several pages: [Home](#), [About us](#), [Privacy Policy](#), [Gallery](#), [Contact us](#) (note that the contact us form – doesn't work), [Site Map](#).

A utility-like virtual environment

Includes typical security flaws

Provides an introductory demonstration of ethical assessment techniques within a SCADA environment

SMART GRID CYBER SECURITY CURRICULUM

- Modular
 - Lecture material
 - Exercise environment
 - Hands-on exercises
- Fully open and available
 - Experts can contribute new content and revise existing content
 - Accessible to CEOs, engineers, and office staff
- Beta release soon
- Cyber security training coverage mapped to job responsibilities and critical infrastructure cybersecurity competencies

Power Fundamentals**1****Guidance****7****Communications****2****Maturity Model****8****Cyber Security Basics****3****Privacy****9****Cyber Infrastructure****4****Security Examples****10****Monitoring and
Situational Awareness****5****Training Evaluation****11****Advanced Metering
Infrastructure (AMI)****6****Security Perspective****12**
18

Security Impact

13

Simulation and Modeling 19

**Security Challenges
DA**

14

RTDS 20

Embedded Assessment 15

PowerWorld 21

Robust Control Systems 16

Time Synchronization 22

Cyber Physical Systems 17

**TLS/SSL
Communications 23**

DNP3 18

... many more 24

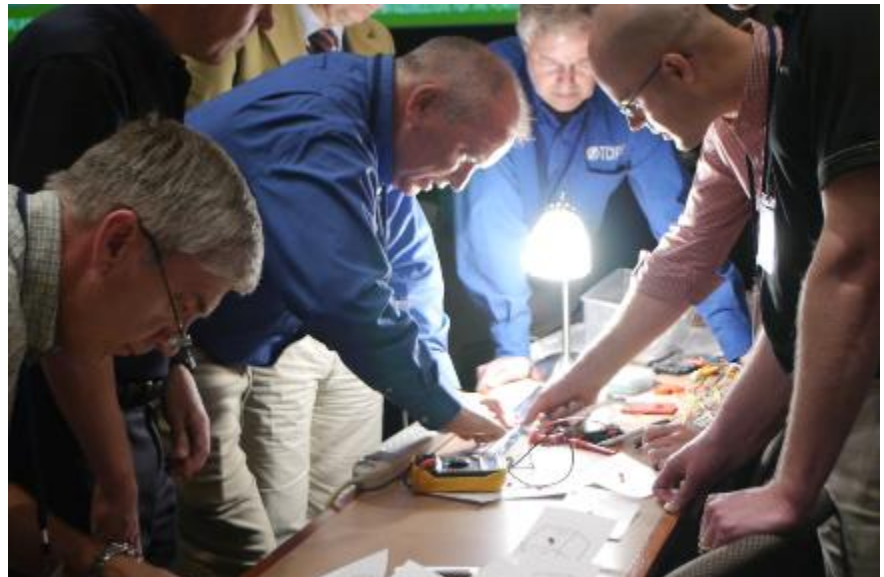
SEEKING OUTREACH AMBASSADORS

IEEE PES GM 2008,
2010, 2013

ASEE Annual K-12
Workshop on
Engineering Education
2013, 2014

TCIPG Summer School

TCIPG Industry
Workshop

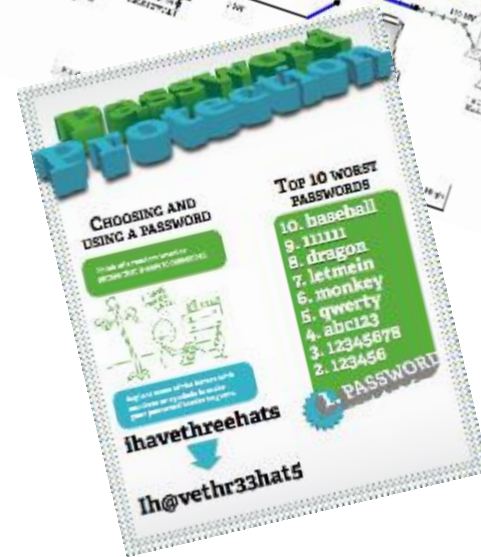
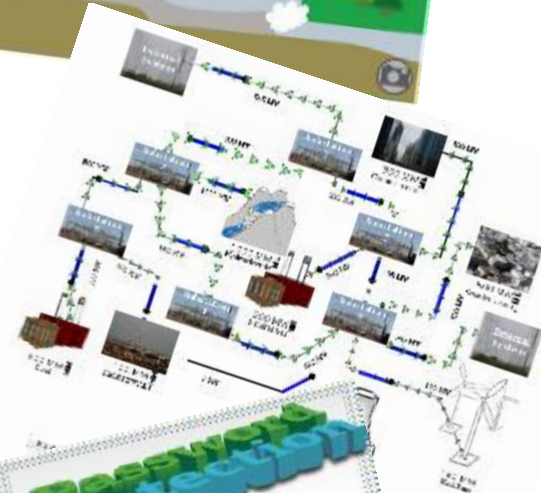


FUTURE PROJECTS

CONTINUING PROJECTS



- Tesla Town v2
- Redesign Power and Energy applets for tablet use
- Create consumer information modules and guidelines for distributed generation and energy management systems
- Work more with representatives from industry

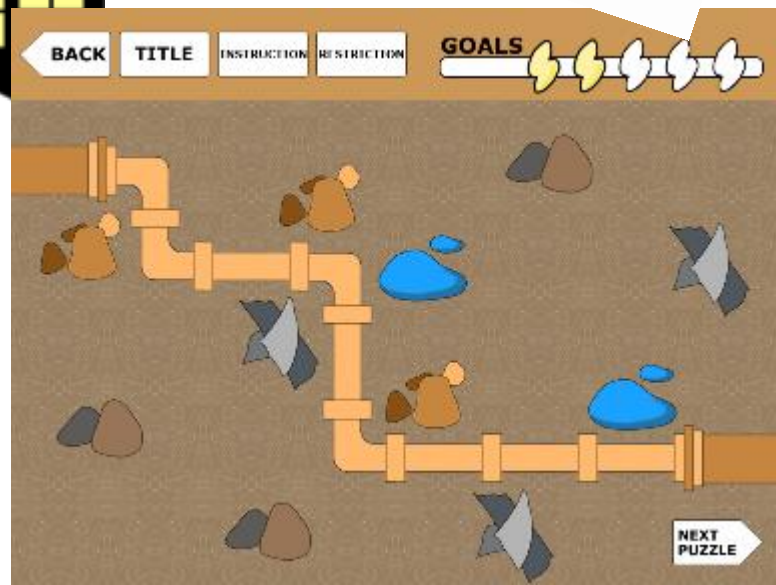


CHARGE ON

A strategy quest through the history of electrification in the U.S.



For iPad and iPhone



NECESSARY EFFORTS

Equally critical to the success of this effort is the education of all interested members of the public as to the nature, challenges, and opportunities surrounding the Smart Grid and its implementation.”

- The Smart Grid: an Introduction (oe.energy.gov)

Engaging learners of all ages

Increasing public awareness

Educating for a cyber secure workplace

Power and Energy applets

64,121 pageviews in the past year
1000 CD's distributed

Tesla Town for the iPad

19,000 iTunes downloads
Available in Google play store

TCIPG Minecraft Power World

Available for download

Hands-on kits

Lesson plans

Posters

Trading cards

