THE ENERGY TALENT CRISIS

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Non-renewable energy resources are in short supply and will possibly be depleted in the next 50 – 100 years.

More immediate problem is that the energy workforce is in crisis.

The average age for energy employees is over 50 and will be retiring in the next 5 – 10 years leaving over 500,000 unfilled jobs.

Even more skilled workers will be needed due to technological advances and demand.
WHY THE LACK OF INTERESTED, FUTURE EMPLOYEES?

- Public perception, especially with younger generations view the energy industry as not as lucrative and lower skilled than other careers.
- This means that qualified workers are not taking the opportunities that the energy field possesses.
- It is imperative that we educate and encourage the next generation to get involved with the energy industry.
GridEd K-12

- A collaborative educational initiative seeking to develop and train the next generation of power engineers.

- Collaborative educational initiative consisting of the Electric Power Research Institute (EPRI), utility and industry sponsors and 4 universities (Georgia Tech, University of North Carolina (Charlotte), Clarkson University, and University of Puerto Rico (Mayaguez)).
POWER/UTILITY ENGINEERING PATHWAY

- 2015: 7 Unit Outline for High School
- 2016: Development of Unit 1: Introduction to Energy (Lesson Plans and Activities)
- 2017: Expansion of Unit 1 to include Lessons and Activities for Middle School Aged Students
- 2018: Revisions and Additions to Unit 1 (High School) Focusing on Lesson 4
UNIT 1 LESSONS

• Lesson 1: A History of Power Systems
• Lesson 2: Energy
• Lesson 3: Work
• Lesson 4: Mechanical Power and Power Generation
• Lesson 5: The Utility Industry Today
• Lesson 6: Introduction to Energy Sources
LESSON 4: MECHANICAL POWER AND POWER GENERATION

- PowerPoints: Mechanical Power and Electrical Power Generation (other PPTs about current, resistance and circuits)
- Work and Power Lab/Investigating Circuits Lab
- Worksheets (different levels determined by math level): Work, Power, Energy, Current, Resistance and Ohm’s Law Worksheets
- Activities: Making a Simple Electric Generator, Making Hydropower, Making a Pinwheel Wind Turbine, Making a Solar Oven
- Projects: Electromagnetism, Pioneers of Electric Circuits, Integrating Technology and Design
- Assessments: Lab Practicum, Work Quiz

(Image courtesy SteveSpanglerScience.com)
WHY THE UTILITIES INDUSTRY?

- With Baby-boomer retirements there are lots of opportunities for qualified applicants.
- Diverse companies and products – many avenues to pursue.
- Earnings for production workers are much higher than in most other industries.
APPROACHES TO CONCEPTS

- Differentiated Learning
- Real-World Connections
- Interests for “Non-Math/Physical Science” Students
DIFFERENTIATED LEARNING

- Multiple Options of Taking in Information
- **Visuals:** PowerPoints, Videos and Demonstrations
- **Reading/Writing:** Individual and/or Group Work; Discussions, Problem Solving
- **Hands on Activities:** Individual and/or Group Work; Labs, Projects, Problem Solving
- **Choice:** Provide Options on Reading/Writing or Project Assignments; Allow for Different Ways to Present the Information (Report, Video, Poster, Skit, Cartoon, etc.)
REAL-WORLD CONNECTIONS

- Analogies for Abstract Concepts
  - Example: Circuits
- “When Will We Ever Use This in Real Life?”
- Use of Electrical Energy Everyday
- Basic Electrical Knowledge
- Problem Solving Skills
\( R_T = 1\Omega + 2\Omega + 2\Omega = 5\Omega \)

\[ I_T = \frac{\Delta V_T}{R_T} \]

\[ I_T = \frac{12 \text{ V}}{5 \Omega} = 2.4 \text{ A} \]

\[ V_1 = (I_1)(R_1) = (2.4 \text{ A})(1 \Omega) = 2.4 \text{ V} \]

\[ V_2 = (I_2)(R_2) = (2.4 \text{ A})(2 \Omega) = 4.8 \text{ V} \]

\[ V_3 = (I_3)(R_3) = (2.4 \text{ A})(2 \Omega) = 4.8 \text{ V} \]
INTERESTS FOR “NON-MATH/PHYSICAL SCIENCE” STUDENTS

- Environmental
  - Alternative Energy Production
  - Reduction of Energy Usage
  - Activism

- Historical/Philosophical
  - Societal Impacts/Changes
  - Science/Technology and Ethics

- Art and Design
  - Architecture
  - Art
  - Music
  - Fashion
ENVIRONMENTAL
KENNEDY SPACE CENTER PZ EXPERIENCE
HISTORICAL/PHILOSOPHICAL

CAUTION
CELL PHONES
IN USE MAY
INTERRUPT
LEARNING

CAUTION
CELL PHONES
IN USE MAY
ENHANCE
LEARNING
ART AND DESIGN

THE INTERACTIVE PRODUCT DESIGN LAB: LIGHT ORCHARD
A program that lets fashion, interior, and textile designers to investigate the joining of technology and textiles in a user-friendly manner.
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