

## Resources for Pre-University Power Engineering Outreach

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## Before We Begin...

- Not intended to be exhaustive listing of resources
- Focused on U.S. opportunities
- See paper for +50 references to materials and resources



## Outline

- Motivation
- Outreach Funding Sources
- Outreach Organizations
- Experiential Learning Activities



## Motivation: Workforce Challenges

- High attrition of engineers in the power and energy industry
- Increased demands of load growth, renewable energy, smart grid, electric vehicles
- Declining engineering enrollment



## Motivation: Solutions

- Develop and Distribute K-12 lesson materials
- Power Engineering Career Promotion
- Power Engineering Image Enhancement



## Motivation: Audiences

- Outreach resources targeted at:
  - K-12 Students
  - K-12 Teachers
  - Guidance Counselors
  - Parents
  - General Public



## Outreach Funding Sources: NSF

- National Science Foundation (NSF)
  - Research Experience for Teachers
  - Advanced Technology Program
  - Bridges to Engineering Education
  - Discovery Research K-12 Program
  - Graduate Teaching Fellows in K-12 Education
  - Distinguished Teaching Scholars Program



## Outreach Funding Sources: Other Govt.

- Department of Energy
- Department of Defense
- Office of Naval Research
- NASA
- Army Research Laboratory



## Foundations

- Green Grants
- Einstein Fellowship
- American Honda Grant
- In-Service Training Grant
- Toshiba Large Grants
- Westinghouse Education Grant
- IBM
- Intel Community
- Pew Charitable Trust
- Phizer Foundation
- Toyota USA Foundation



## Outreach Organizations

- IEEE
- IEEE Power & Energy Society
- American Society of Engineering Education (ASEE)
- Center for Energy Workforce Development (CEWD)
- TryEngineering.org
- Junior Engineering Technical Society (JETS)

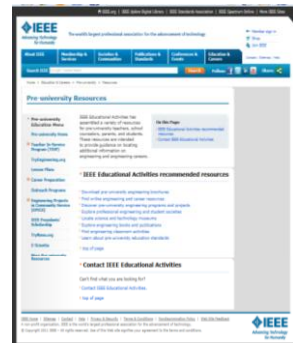


## IEEE

- Many electrical engineering focused resources
- Train-the-trainer
- Brochures
- Classroom activities
- Pre-university education standards
- Links to other on-line resources
- Many more...




[www.ieee.org/education\\_careers/education/preuniversity/resources/index.html](http://www.ieee.org/education_careers/education/preuniversity/resources/index.html)





## IEEE Power & Energy Society

- More focused on University-level education
- Power & Energy Education Committee (PEEC)
  - Career Promotion and Workforce Development Subcommittee
  - Student Activities Subcommittee
- Publications on K-12 outreach
- Scholarship Plus Initiative



## IEEE Power & Energy Society

- [www.ieee-pes.org/education/resources](http://www.ieee-pes.org/education/resources)
- College Level course material
- Educational software
- Interactive Applets
- Career promotion videos


## IEEE PES Scholarship Plus Initiative

- [www.ee-scholarship.org](http://www.ee-scholarship.org)
- Multi-year career experience and scholarship program
- Links to videos, universities with power courses, career promotion activities




## ASEE

- Publications and conferences on pre-college outreach materials
- K-12 & Pre-college Engineering Division
  - Development and dissemination of pre-college engineering curricula and outreach activities
- eGFI





## ASEE eGFI

- [www.egfi-k12.org/](http://www.egfi-k12.org/)
- Newsletter
- Games
- Blogs
- Store




## CEWD

- [www.cewd.org](http://www.cewd.org)
- Non-profit consortium of utilities
- Addressing workforce shortage
  - Engineering
  - Trades
- Get Into Energy

## CEWD Get Into Energy

- [www.getintoenergy.com](http://www.getintoenergy.com)
- Career promotion
- Games, contests
- Links
- Resources for teachers, parents



## TryEngineering.org

- On-line presence
- Collaborative effort between engineers, educators, industry and engineering, teaching and counseling associations



## TryEngineering.org

- [www.tryengineering.org](http://www.tryengineering.org)
- Engineering career promotion materials
- Lesson plans
  - Switches
  - Insulators and conductors
  - Solar energy
  - Wind energy



## Example Lesson Plans

- Basic concepts
- Clear learning outcomes
- Simple materials



## JETS

- Increase interest in engineering and technology professions
- Focused on high school students
- Several programs:
  - TEAMS: national high school competition
  - NEDC: national engineering design challenge
  - UNITE: summer STEM classes
  - Engineering clubs
  - Scholarships
- Universities can host programs



## JETS

- [www.jets.org](http://www.jets.org)
- Competition instructions
- Hosting information
- Videos



## Experiential Learning Activities

- Hands-on engineering activities
- IEEE Teacher In-Service Program
- IEEE Training the Trainer
- TryEngineering.org
- Engineering Projects in Community Services (EPICS)
- Engineers Week



## Summary

- Pre-University (K-12) Outreach is critical to maintaining full pipeline of engineering workforce
- Several organizations offer funding and resource material
- See paper for complete references



Questions?



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