Skilled Work Force Issues

Presentation to the
U.S. Department of Energy
by the IEEE Joint Task Force on QER

Background

- Increased dependence on electricity
- Aging workforce
- Power System going through rapid changes
- Renewal generation and storage operations
- New technologies
- Growing threats: Cyber and Physical
- Increased use of automation - but need to train when automation fails

How do we train for mission critical jobs?

Military Veterans

High school and
Community College Grads

- Vocational Training
- Certification Programs
- Degree Programs

Opportunities

- DOE can be catalyst and convener to form partnerships within education, labor, industry and government sectors
- Develop shared curricula for community colleges and universities that aligns with industry needs with a published roadmap
- Develop annual recognition programs for examples of excellent programs
- Address work force issues as part of DOE and NSF projects
- Introduce certification programs for needed skills
- Increase programs for veterans

Certification Programs

- Lower barriers to entry
- Awards are made based on competency not seat time
- NERC System Operator Program is a successful example
- Needs a recognized body (e.g. IEEE) to award the certificates.
- Strong demand for Substation and System Protection Technicians
- Would provide opportunities for veterans and women

Military Veterans

- Traditionally joined energy industry through informal networks
- Bring valuable skills for leadership, teamwork, discipline, safety, watchfulness, attentiveness to detail and adaptive to change
- Handle routine shifts and quickly transition to emergency operations
- Average age on technically sophisticated Aircraft Carrier – 19 years
- Formal programs (CEWD Troops to Energy and IncSys Power4Vets) provide clear pathways and support for veterans
- More formal transition programs are needed

Power4Vets

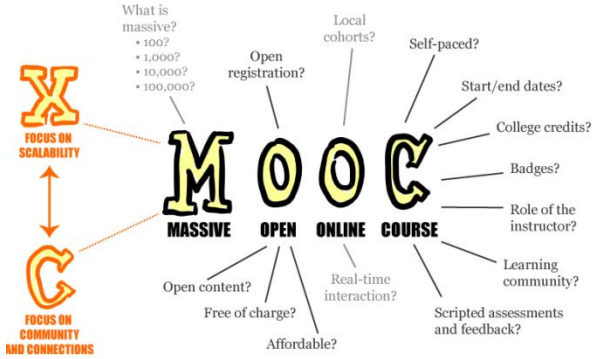
TROOPS to ENERGY JOBS

Soft Skills are Critical

- Agile Reasoning
- Ability to Plan
- Attention to Detail
- Grasps Big Picture Overview
- Excellent Communicator
- Team Player
- Capability to Lead
- Flexible
- Has Emotional Control under Stress
- Adapts to changing environment

Curriculum

- Develop roadmap of curriculum for utility engineer
- Need to address fundamentals of utility planning, operation and control across generation, T&D, and Smart Grid and Renewable technologies
- US Power and Energy Engineering Workforce Collaborative to agree on curriculum and jobs, tasks and competencies
  - Australian Power Institute Collaborative as example
- Encourage Massive On-line Open Courses
  - On-line demonstrations of experiments and lectures
  - Support studies with open source or low cost software tools on openly published sample power system models



Example: Placing Veterans as System Operators

- Power4Vets Program - Launched by IncSys as part of DOE Smart Grid Workforce Training Program
- Recruits veterans with strong background in electrical systems (e.g. navy nuclear, army prime power)
- Provides on-line self paced training with realistic web based simulation of the same generic power system that is also used widely to train NERC certified operators
- 63 Veterans obtained their NERC System Operator Certification.
- Program is sustained after the DOE project with 76 veterans enrolled
- Success depends a close match between job requirements and military record, industry recognized certification and full time recruiter at Norfolk Navy Base

Example: Humanitarian Outreach

- Seattle University EE Department Humanitarian Outreach program attracts students, especially women to EE
- Students design and build small PV, Wind and Hydro based microgrids
- Students travel to Zambia and Kenya to implement their projects
- Students practice mechanical and electrical trade skills as they put theories and concepts into practice both in the university workshops and in the field
- Students develop soft skills as they work as a team and with villagers in a remote region without running water and electricity.
- In 2013 was awarded 80,000 Euros by Alstom to build a micro grid and community charging station at a school in Muhuru Bay, Kenya
- in 2014 received the Grand Prize in the NCEES Engineering Award competition for the Muhuru Bay project

Summary Recommendations

- Partnerships: Education, labor, industry and government sectors > new curriculum development
- Certification programs: Competency based to demonstrate student skill level
- Assess Workforce Issues at federal level
- Develop Annual recognition programs for excellence
- Coordinate to share curriculum
- Support Transition of military veterans
- DOE and NSF Energy R&D to address workforce issues

IEEE REPORT TO DOE QER ON PRIORITY ISSUES

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