Educating Tomorrow’s Power Technicians and Engineers Today

June 15, 2009
11:00 - noon

Betsy Levingston, SPHR
Director of Training & Workforce Development
&
Jo Winger de Rondon
Vice President – CAEL Denver

2009 APPA Nat’l Conference
About Lakeland Electric

- Established August 8, 1904
- Florida’s 3rd Largest Public Power Utility
- 600 Employees
Agenda

- Situation Analysis
- Industry & Education Collaborations
- Florida College Programs
- State Partnerships
Situation Analysis*

An Aging Workforce
- 52% in the 45+ age group
- 28% in the 35-44 age group
- 17% in the 25-34 age group
- 3% in the less than 25 age group

Experience Drain
- 50% of employees are “retirement eligible”
- Retirement eligible experience = 10,703 years!

Average Age and Years of Service
- 44 years
- 18 years of service (42.5% have 20+ years)

*Industry Averages
Lakeland Electric Workforce Retirement Projection 2009-2012
Breakthroughs Require Diverse Skills

- Asset Management
- Power electronics
- Advanced protection equipment
- Sophisticated computations
- New monitoring systems
- Powerful communications
- Risk assessment and management
- Circuit of the Future (distribution)
- Utility of the Future (smart grid)
- Integration of wind, dispersed generation and storage
Student Survey Identifies Opportunity

Student Feedback Focus Groups

- Image is ‘old-fashioned’
- Offerings are for academics: not relevant for practitioners
- Be more ‘open’ and ‘inviting’

• Top three career path influencers:
  1. Interesting career
  2. Opportunity to solve significant societal challenges
  3. Make the world a better place to live

• Energy and Power Engineering is...
  – Exciting
  – Critical to society-at-large
  – Relevant opportunities

• 48% were “more” or “significantly more” interested in PES with the name change
Power Engineering Academic Status

*Inside USA*

• Retirements outpacing new professor hires
  – Average age increasing
  – Power program faculties have less than 3 professors

• Viable programs are down

• Students:
  – Attracted to other areas
  – Many are non-US

*Outside USA*

• New professor hires outpace retirements
  – Average age decreasing
  – Power faculties have more than 10 professors

• Growing enrollment

• Students:
  – Positive image
  – Potential provider for U.S.
GROW OUR OWN

• High School
  Lakeland Electric Power Academy
  • Four-year
  • Industry Certification
  • First Year—74 Students

• Community College
  – A.S./A.A.S. Degrees
    • Electrical/Instrumentation/Automation Technicians (E&I/A)
    • Mechanical
    • Journeyman upgrade training
    • Electrical Distribution Technology
Question:

Which educational career cluster do you think jobs in the energy industry reside?

A) Agriculture, Food and Natural Resources
B) Architecture and Construction
C) Manufacturing
D) Science, Technology, Engineering and Mathematics
E) All of the above
Energy Jobs Career Cluster Map

Career Clusters
A grouping of occupations and broad industries based on commonalities. The sixteen career clusters provide an organizing tool for schools, small learning communities, academies and magnet schools.

Clusters

- Agriculture, Food and Natural Resources
  - Production, processing, marketing, distribution, financing & development of agricultural commodities including natural resources such as coal, natural gas and renewables
  - Power, Structural and Technical Systems:
    - Engineering Specialist
    - Equipment Maintenance Technician
    - Welder

- Architecture and Construction
  - Designing, planning, managing, building and maintaining the built environment
  - Construction:
    - Pipefitter
    - Piplayer
    - Lineworker
    - Electrical & Power Transmission Installers

- Science, Technology, Engineering and Mathematics
  - Planning, managing, and providing technical services
  - Engineering and Technology:
    - Electrical Engineer
    - Power Systems Engineer
    - Mechanical Engineer
    - Nuclear Engineer

- Manufacturing
  - Planning, managing, and performing the processing of materials into the intermediate or final products
  - Manufacturing Production Process Development:
    - Electrical and Electronics Technician
    - Engineering and related Technician
    - Power Generating & Reactor Plant Operator

Pathways

- Recommended additions
  - Maintenance Operations:
    - Electrician
    - Boilermaker
    - Pipefitter
    - Piplayer
    - Substation Technician
    - I & C Technician
    - E & I Technician

  - Science and Math:
    - Nuclear Chemist
    - Nuclear Technician

  - Maintenance, Installation & Repair:
    - Boilermaker
    - Pipefitter
LE Collaborations

- Polk County School Board
- Polk Community College
- Florida Department of Education
- Polk Manufacturing Association
- Workforce Board
Program Features

• Resources/ Curriculum
  • MSSC
  • NCCER
  • Rockwell Automation
  • RWD
  • Traviss Career Center--Welding
Program Features, cont

- Four Semesters
- Polk Community College
  - 15 Gen. Ed. Credits
  - 18 E.T. Core Credits
    - Manufacturing Essentials Curriculum (MSSC)
- 4000 OJT hours
  - Two days—class
  - Three days—field
Program continued

- Industrial Skills Fundamentals
  - 18 Weeks
- Trade Specific Curriculum
  - 12-18 Months (dependent on trade)
Year 1

I. GENERAL EDUCATION COURSES (15 credit hours)
   - Computer Aided Drafting
   - Introduction to Electronics
   - Manufacturing Materials & Processes
   - Mechanical Measurements & Instrumentation
   - Quality
   - Safety

II. ENGINEERING TECHNOLOGY CORE (18 credit hours)
   - Advanced Manufacturing
   - Advanced Technology
   - Electronics
   - Quality
   - Mechanical Design & Fabrication

Year 2

III. ENGINEERING TECHNOLOGY SPECIALIZATION TRACTS (27 credit hours in 1 of 5 tracts)
   - Advanced Manufacturing
   - Advanced Technology
   - Electronics
   - Quality
   - Mechanical Design & Fabrication

Certificate Pathway
- Certificate Pathway starting with MSSC

2-Year Pathway
- 2-Year Pathway starting with MSSC

GED to 15 credits of ET Core Courses
- Workforce
- Technical School

A.S. or A.A.S. DEGREE in ENGINEERING TECHNOLOGY (with one of five specializations)
- B.A.S. - Bachelor’s of Applied Science
- B.S.A.S. - Bachelor’s of Science in Applied Science
- B.S. E.T. - Bachelor’s of Science in Engineering Technology

College Credit Certificate and/or
- MSSC Certified Production Technician (CPT)
E.T. Degree Components: Specializations and College Credit Certificates

III. ENGINEERING TECHNOLOGY SPECIALIZATION TRACTS
(27 credit hours in 1 of 5 tracts)
- Quality
- Electronics
- Advanced Manufacturing
- Advanced Technology
- Mechanical Design & Fabrication

- Lean Six-Sigma Greenbelt (12 Cr)
- Six-Sigma Black Belt (12 Cr)
- Electronics Support Specialist Certificate (12 Cr)
- Automation Certificate (12 Cr)
- Lean Manufacturing (12 Cr)
- Hydraulics, Pneumatics & Motors Certificate (12 Cr)
- Advanced Technology Specialist Certificate (16 Cr)
  - Composites Technology (16 Cr) NEW 0509
- CNC Operator Certificate (12 Cr)
- Computerized Woodworking (12 Cr)

Future Specializations
- Industrial Design (CADD)
- Medical Systems
- Energy Systems?
- Power Operation?
FLATE Update:  
Curriculum

E.T. Degree: Initiating Partners & Degree Adoptions

- Colleges participated in ET Degree Development
- Colleges implementing ET Degree currently
- Colleges planning to adopt the ET Degree in 2009
- Colleges considering future adoption

MSSC Assessment Centers

[Map of Florida showing different counties with stars indicating participation in the ET program]
Industry & Education Collaboration

What is the Measure of Success?

- Trained Workforce
  - Proper Certifications
  - Right Attitude and Drive
  - Job Satisfaction
- Lower Employee Turnover Rates
- Improved Student Performance (Goal)
  - Graduation Rates
  - GPA Performance
  - Attendance
  - Attitude
FEWC... WHO?

Industry: Florida’s municipal utilities, IOU’s, electric cooperatives, associations, & CEWD

Workforce: State and local

Education: Community Colleges, School Districts, State Dept. of Education

Organized Labor: IBEW, UWUA
Florida Energy Workforce Consortium

www.getintoenergy.com
What do we, as utility partners, contribute?

- Offer workshops to help teachers learn about the energy industry
- Sponsor special activities at the school
- Judge events (i.e. SKILLS USA and Science Fair)
- Coordinate Mentor programs
- Sponsor field trips
- Host Summer Energy Camps
What do we contribute, continued

- Serve as advisors to academy teachers
- Donate materials and supplies when requested
- Offer summer internship opportunities
- Host annual awards program to recognize successes
- Provide safety tools—hard hats/glasses
- Host career days for teachers
Resources

• National Career Academy Coalition (NCACINC.com)
• Center for Energy Workforce Development (CEWD.org)
• Florida Advanced Technological Education Center (FLATE)
• Advanced Technology Environmental and Energy Center (ATEEC)
• IEEE Workforce Collaborative
• MSSC
• NCCER.org
Questions?
Online Energy Education and Training

...built by the industry for the industry
Introduction

Jo Winger de Rondon
Vice President – CAEL Denver
jwdr@cael.org

www.epceonline.org
Agenda

• Online Education
• Evidence of success
• Solutions for YOUR industry
• What Works!
• Next steps
Poll

• # taken courses in the last 5 years
• # taken online education courses
• # would like to enroll in courses
• # who would consider online education
• See value related to your work/industry
Online Education

Definition
• Convenient, available 24x7
• Asynchronous, interactive and instructor led
• highly interactive
• Equal to traditional model of education

Quality
• College rigor and structure
• Credit bearing
• Accredited institutions - experts in energy education
• Not self-paced; not CBT

Exciting results
• 3.2 million learners – at least one course 2005-6 year
• Research indicates need for education and continuous learning
• Access is key for adult learners
<table>
<thead>
<tr>
<th>Why</th>
<th>Advantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexibility</td>
<td>Student centered learning</td>
</tr>
<tr>
<td>Access</td>
<td>Increase student interaction</td>
</tr>
<tr>
<td>Cost effective</td>
<td>Access to faculty from around the globe</td>
</tr>
<tr>
<td>Positive learning outcomes</td>
<td>Instructors more approachable</td>
</tr>
<tr>
<td>IT skills and learning to access knowledge</td>
<td>Increase connections among students</td>
</tr>
<tr>
<td>Less intimidating</td>
<td>Facilitates team learning</td>
</tr>
</tbody>
</table>

**Why**

- Flexibility
- Access
- Cost effective
- Positive learning outcomes
- IT skills and learning to access knowledge
- Less intimidating

**Advantages**

- Student centered learning
- Increase student interaction
- Access to faculty from around the globe
- Instructors more approachable
- Increase connections among students
- Facilitates team learning
Requires

• Self Motivation
• Time management
• Navigation between
  – Work
  – Family
• Discipline
  – Educational demands
  – Other responsibilities
Your Industry
Energy Providers Coalition for Education (EPCE)

What is it?
• Non-profit partnership
• Founded in 2000
• Innovative industry-wide collaboration
• Grows to meet talent needs

How does it work?
• Structure
  – Governance Team (elected position)
  – Curriculum Committees
  – Marketing Committee
EPCE Provides

- **Online Energy Education**
  - *Built by the industry for the industry*
  - Specific to and sponsored by the industry
    - Electric, Gas, Nuclear and Engineering
  - Quality
  - Convenient
High school curriculum for the Electric Power Industry
Virtual High School

Orientation to the Electrical Industry
Bismarck State College

Industrial Aptitude test prep course
Bismarck State College

EPCE Education Pathways

Electric Power
- AAS or Certificate in Electric Power Technology
  Bismarck State College
- BSAST in Energy Utility Technology
  Thomas Edison State College

Nuclear Power
- AAS or Certificate in Nuclear Power Technology
  Bismarck State College
- BS in Nuclear Engineering Technology
  Excelsior College

Or Take Individual Courses

Natural Gas
- Certificate in Natural Gas Distribution
  Thomas Edison State College

Electrical Engineering
- BS in Electrical Engineering (BSEE)
  Clemson University College

Courses to get connected to the energy industry
EPCE Benefits

- Tuition discount for EPCE members!
- Grow Your Own
- Draws Diverse students
- Network with peers
- Design vision for future!
Orientation to the Electrical Industry

This non-credit course covers the history of the electrical industry and examines the major players involved in its initial creation, development and structure. It also deals with the basics of generation, transmission, and distribution. The course discusses the impact of deregulation, new technologies, and the future outlook of the electrical industry.

6-8 hours of content

Great for employees who are new to the industry or those wanting to learn the basics of the electrical industry

Offered by Bismarck State College (BSC)
AAS in Electric Power Technology

- 15 core technical courses, plus
- General education
- 4 Specialization areas (3 courses each):
  - Line Construction, Substation, Systems Design, or Metering
- Certificate program also available
- Students can take individual classes
BSAST in Energy Utility Technology

- Designed for maintenance & repair, lineworkers, first line supervisors, plant operators
- College credit awarded for professional industry training
- Degree completed via online courses, examination programs, prior learning assessment, credit transfer, ACE
- Total 120 credits for degree

Partial list of courses:
Certificate in Gas Distribution

- For gas technicians, job designers, workers new to natural gas, and those in the industry interested in transitioning to supervisory roles

- 15 credit hours include:
  - Gas combustion and distribution
  - Regulatory policy and procedure
  - Principles of management
  - Foundation for Pipeline Operator Qualification assessments
BS in Electrical Engineering

Partnership with Clemson University

- Courses are contextualized for the Power Industry
- ABET accredited
- Provides fundamental education in core EE areas such as circuits, electronics, electromagnetics, controls, power, and communications
- These fundamental areas are more fully developed by specialization in elective courses in Energy Conversion, Power Systems Analysis, and Electric Machines, Power Electronics and Drives
New Pipeline – high school approach

“Light Up Your Future”

- High school online education and recruiting model
- Online high school applied math course for the electric industry
- Create awareness of careers in electric power industry with site tours, job shadowing, etc
- Connect students to local utilities and potential industry careers
- Possibility for local utility internships and scholarships
- Migrate to online energy-related college programs
What Works Strategies

• Create internal career path
• Blend with apprenticeship training model
• Create an education baseline for work groups
• Imbed in new hire/supervisor training
• Sponsor successful models:
  – Cohort based approach
  – Executive support strategy
Next steps

- Identify needs – opportunities
- Analyze what is available
- Connect with industry peers
- Design a plan
- Start with a pilot
- Create support for learning
- Align plans with business goals
- Call us! 303.804.4670
Energy Providers Coalition for Education

www.epceonline.org

Thank you!

jwdr@cael.org
Sources

- WorldWideLearn.com
  - Why Do Students Like Online Learning?

- Making the Grade: Online Education in the United States, 2006
  - (Alfred P. Sloan foundation annual survey – Sloan Consortium Publication)