Energy Industry Fundamentals
Building an Educated Workforce
“The utility industry is losing legacy brain power at a rapid rate and it’s not yet in the position to compete with other “more exciting” and higher paying industries to attract the best and brightest.”

-T & D World “Utilities Face Massive Brain Drain” 4/14/14
Working Together

**Center for Workforce Development (CEWD)**
- Formed in March 2006
- A national non-profit consortium of electric, natural gas, and nuclear utilities and their associations
- Focuses on the need to build a skilled workforce pipeline that will meet future industry needs with a mission is to build the alliances, processes, and tools to develop tomorrow’s energy workforce

**Virginia Energy Workforce Consortium (VEWC)**
- Formed in 2007
- First partnership in Virginia between utilities, their associations, educators and workforce systems to focus on the need to build a skilled, diverse workforce pipeline that will meet future industry needs
- Teams with secondary and post-secondary educational institutions, the public workforce system, and local, regional and state government agencies to create workable solutions
Workforce Challenges –
Our Perspective

• Retirements
• Availability of a qualified workforce
• Competition for Talent
• Connecting Education to the Industry
Workforce Demographics

Source: CEWD Gaps in the Energy Workforce Pipeline
## National Growth Projections

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Electric Power Distribution</td>
<td>212,714</td>
<td>32,459</td>
<td>13%</td>
<td>6,492</td>
<td>88,089</td>
<td>116,125</td>
<td>$56,793</td>
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<tr>
<td>Nuclear Electric Power Generation</td>
<td>52,338</td>
<td>1,702</td>
<td>3%</td>
<td>340</td>
<td>21,674</td>
<td>28,572</td>
<td>$58,183</td>
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<tr>
<td>Natural Gas Distribution</td>
<td>112,326</td>
<td>875</td>
<td>1%</td>
<td>175</td>
<td>46,516</td>
<td>61,321</td>
<td>$51,168</td>
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<tr>
<td>Electric Bulk Power Transmission and Control</td>
<td>25,033</td>
<td>-524</td>
<td>-2%</td>
<td>-105</td>
<td>10,367</td>
<td>13,666</td>
<td>$57,955</td>
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<tr>
<td>Other Electric Power Generation</td>
<td>8,938</td>
<td>-809</td>
<td>-10%</td>
<td>-162</td>
<td>3,701</td>
<td>4,879</td>
<td>$54,014</td>
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<tr>
<td>Hydroelectric Power Generation</td>
<td>6,744</td>
<td>-4,617</td>
<td>-217%</td>
<td>-923</td>
<td>2,793</td>
<td>3,682</td>
<td>$54,833</td>
</tr>
<tr>
<td>Total</td>
<td>517,941</td>
<td>6,068</td>
<td>1%</td>
<td>1,214</td>
<td>214,490</td>
<td>282,754</td>
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## Mid-Atlantic Growth Projections

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Electric Power Distribution</td>
<td>20,219</td>
<td>2,102</td>
<td>9%</td>
<td>420</td>
<td>8,373</td>
<td>11,038</td>
<td>$58,749</td>
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<tr>
<td>Nuclear Electric Power Generation</td>
<td>6,754</td>
<td>381</td>
<td>5%</td>
<td>76</td>
<td>2,797</td>
<td>3,687</td>
<td>$60,089</td>
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<tr>
<td>Natural Gas Distribution</td>
<td>7,200</td>
<td>-422</td>
<td>-6%</td>
<td>-84</td>
<td>2,982</td>
<td>3,931</td>
<td>$51,883</td>
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<tr>
<td>Electric Bulk Power Transmission and Control</td>
<td>2,272</td>
<td>-143</td>
<td>-7%</td>
<td>-29</td>
<td>941</td>
<td>1,240</td>
<td>$59,206</td>
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<tr>
<td>Other Electric Power Generation</td>
<td>295</td>
<td>-126</td>
<td>-75%</td>
<td>-25</td>
<td>122</td>
<td>161</td>
<td>$50,459</td>
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<tr>
<td>Hydroelectric Power Generation</td>
<td>569</td>
<td>-4,617</td>
<td>-217%</td>
<td>-923</td>
<td>2,793</td>
<td>3,682</td>
<td>$54,833</td>
</tr>
<tr>
<td>Fossil Fuel Electric Power Generation</td>
<td>10,422</td>
<td>-2,400</td>
<td>-30%</td>
<td>-480</td>
<td>4,316</td>
<td>5,690</td>
<td>$58,642</td>
</tr>
<tr>
<td>Total</td>
<td>47,731</td>
<td>-990</td>
<td>-2%</td>
<td>-198</td>
<td>19,766</td>
<td>26,057</td>
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</tbody>
</table>
## Potential Replacements by 2022

<table>
<thead>
<tr>
<th>Job Category</th>
<th>Potential Attrition &amp; Retirement</th>
<th>Estimated Number of Replacements</th>
<th>Potential Retirement</th>
<th>Estimated Number of Replacements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lineworkers</td>
<td>32%</td>
<td>24,100</td>
<td>14%</td>
<td>10,300</td>
</tr>
<tr>
<td>Technicians</td>
<td>41%</td>
<td>28,300</td>
<td>14%</td>
<td>10,100</td>
</tr>
<tr>
<td>Plant Operators</td>
<td>42%</td>
<td>14,900</td>
<td>13%</td>
<td>4,600</td>
</tr>
<tr>
<td>Engineers</td>
<td>34%</td>
<td>9,200</td>
<td>12%</td>
<td>2,900</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>36%</strong></td>
<td><strong>76,500</strong></td>
<td><strong>14%</strong></td>
<td><strong>27,900</strong></td>
</tr>
</tbody>
</table>

*Totals exclude Nuclear*
Challenges

- Changes in Regulatory Policy
- Infrastructure Modernization
- Changes in Generation Mix
- Adoption of Technology
Issues Facing the Industry

65% of all American employment now requires specific skills

Almost 40% of employees in the energy industry are in job categories considered critical

50% of applicants can’t pass entrance exams

Fewer kids are studying the STEM curriculum in schools
New Critical Jobs

Companies were asked what new jobs are becoming critical in terms of difficulty in hiring, etc.

- Cybersecurity / IT
- 1st line supervisors
- System control operators/transmission dispatchers
- Power traders
- Customer service
- Corrosion control/pipeline inspectors
Governor’s Executive Order 23:

Signed August 13, 2014, Establishing the New Virginia Economy Workforce Initiative includes the following:

• The creation of a new Commonwealth Consortium for Advanced Research and Statistics to drive economic development in the Commonwealth by identifying Virginia’s workforce needs and advantages.

• A goal for the administration to produce 50,000 STEM-‐H credentials, licenses, apprenticeships, and associate’s degrees.

• A commitment to hiring veterans including doubling the number of veterans hired through the Virginia Values Veterans Program.

• A focus on goals, strategies, and recommendations to strengthen Virginia’s current and future economy.
Business from Mars? Educators from Venus?

- Two different worlds
Business from Mars? Educators from Venus?

- Two different worlds
- CTE juncture leading the way
Business from Mars? Educators from Venus?

- Two different worlds
- CTE juncture leading the way
- Game-changing initiatives
CEWD Mission
Build the alliances, processes, and tools to develop tomorrow’s energy workforce

Career Awareness
Education

Industry Solutions
- Regional Implementation

Workforce Planning and Metrics
Structure and Support
Energy Competency Model

Tier 6-8 – Occupation-Specific

Tier 5 – Industry-Specific Technical
- Nuclear Generation
- Generation (Coal, Natural Gas, Oil, Hydro, Solar, Wind, Biofuel, Geothermal)
- Electric Transmission & Distribution
- Gas Transmission & Distribution

Tier 4 – Industry-Wide Technical
- Industry Principles & Concepts
- Safety Awareness
- Environmental Laws & Regulations
- Quality Control & Continuous Improvement
- Troubleshooting

Tier 3 – Workplace Requirements
- Business Fundamentals
- Team Work
- Following Directions
- Planning, Organizing & Scheduling
- Problem Solving Decision Making
- Working With Tools & Technology

Tier 2 – Academic Requirements
- Mathematics
- Reading
- Writing
- Listening
- Speaking
- Engineering & Technology
- Critical & Analytical Thinking

Tier 1 – Personal Effectiveness
- Interpersonal Skills
- Integrity
- Professionalism
- Motivation
- Dependability & Reliability
- Self-Development
- Flexibility & Adaptability
- Ability To Learn
Tier 6–8 Job Specific Skills/Credentials
- Associate Degree
- Boot Camp / Apprenticeship for College Credit
- Accelerated Associate Degree

Tier 4–5 Industry Fundamentals
- Energy Industry Fundamentals Certificate

Tier 1–3 Basic Training
- Energy Industry Employability Skills Certificate
- National Career Readiness Certificate

Occupation-Specific Requirements
Occupation-Specific Technical
Occupation-Specific Knowledge Area
Industry-Specific Technical
Industry-Wide Technical
Workplace Requirements
Academic Requirements
Personal Effectiveness
What is Energy Industry Fundamentals?

EIF provides:

A broad understanding of the electric and natural gas utility industry.

Course includes the following modules:

• Basic and emerging principles and concepts that impact the energy industry
• Compliance with procedures necessary to ensure a safe and healthy work environment
• Electric power generation
• Electric power and natural gas transmission
• Electric and natural gas distribution
• Energy careers and entry requirements
• Energy ‘hot topics’ (such as Smart Grid technologies)
Energy Industry Fundamentals
Why an EIF Certificate?

There is no other credential that ensures potential workers have an understanding of the industry as a whole.

- This training/credential helps make occupation-specific training more meaningful, and
- Enables students to understand how one’s company (once hired) and job fits into the big picture.

In many instances, utilities end up having to provide this training after employees are hired.
Energy Industry Fundamentals

Benefits

Benefits to Students:
Learning the right material that will help them succeed at their jobs.
Material was created by industry for industry

Benefits to Employers:
Applicants who understand how the industry works and how jobs fit into the big picture
Validation that the applicant has a fundamental understanding of the energy industry.
Energy Industry Fundamentals Requirements

• Educational institutions must become an Approved Course Provider, that information can be found in the Approved Course Provider Handbook.

• The EIF curriculum must be taught in its entirety.

• Curriculum is available at no cost on our curriculum sharing site Energy Industry Fundamentals Curriculum

• Educational institutions must have an Utility Industry Partner.
Energy Industry Fundamentals Credential

What is Required of Our School to Issue the EIF Credential?

- Your school must be an Approved Course Provider
- You must purchase the assessment through Kuder
- Your students must pass the exam with a 68% or higher
Energy Industry Fundamentals
What Are The Costs?

- Curriculum is available at no cost on our curriculum sharing site Energy Industry Fundamentals Curriculum
  - This includes all course material
  - Instructor and Student study guides
  - Access to our online curriculum
- There is a $50.00 application fee to become an Approved Course Provider
- A $30.00 assessment fee per student
Energy Competency Tier Model for Skilled Technician Positions in Energy Efficiency, Energy Generation and Energy Transmission and Distribution

### Tier 1–3 Basic Training
- Energy Industry Employability Skills Certificate
- National Career Readiness Certificate

### Tier 4–5 Industry Fundamentals
- Energy Industry Fundamentals Certificate

### Tier 6–8 Job Specific Skills/Credentials
- Associate Degree
- Boot Camp / Apprenticeship for College Credit
- Accelerated Associate Degree

### Tier 4–8 Occupation Specific Requirements
- Occupation-Specific Requirements
- Occupation-Specific Technical
- Occupation-Specific Knowledge Areas
- Industry-Specific Technical
- Industry-Wide Technical
- Workplace Requirements
- Academic

### Personal Effectiveness

Energy Competency Tier Model for Skilled Technician Positions in Energy Efficiency, Energy Generation and Energy Transmission and Distribution
Degree and Certificate Job-Readiness Skills

What you will learn

quality education
Lineworkers:
Annual Salary Range: $36k – 83k
Education level: High school to associate’s degree

Technicians:
Annual Salary Range: $30k – 70k
Education level: High school to associate’s degree

Power Plant Operators:
Annual Salary Range: $37k – 81k
Education level: High school to associate’s degree

Pipefitters, Pipelayers, and Welders:
Annual Salary Range: $28k – 60k
Education level: High school to associate’s degree
Get Into Energy

• Focuses on critical jobs – Lineworker, Plant Operator, Technician, Pipefitter / Pipelayer, Engineers
• Career assessment tool, career profiles, skills, and education required
• Parents and Educators sections

www.getintoenergy.com
Course Competencies

- Select Verso
- Click on Science, Technology, Engineering and Mathematics

Credentials and Sequence

- Select APG
- Enter 8448
- Click Course Search
Resources

**Lynn Basham, Ph.D., DTE**
Technology Education Specialist
Career and Technical Education
Virginia Department of Education
Lynn.Basham@doe.virginia.gov
804-786-4210

**Julie Strzempko, Consultant**
CEWD
julie@cewd.org
413-575-8605

**Leilani Todd, VP of HR**
Mecklenburg Electric Cooperative
ltodd@meckelec.org
434-372-6191

**Matt Kellam, Supervisor - Staffing**
Dominion, Staffing & Diversity
Matt.L.Kellam@dom.com
804-771-3045