

# *Managing the Talent Challenge*

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**June, 2006**

# *Agenda*

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- Numbers We Cannot Ignore
- Reflecting on Industry Events
- Workforce Overview
- Survey Results
- Proactive Steps

# *Numbers We Cannot Ignore* (United States)

- Workers are getting older
  - By 2010, one in three U.S. workers will be age 50 or older
  - Utility executives estimate ½ of the technical workforce will reach retirement age in 5 – 10 years
  - At 50+, utility craft workers have highest average age of any industry
  
- Demand is increasing
  - In 2015, a 15% decline of ages 35 – 44; demand increases 25%
  - 2010 demand for U.S. electrical engineers in construction will be up from 150,000 today to 175,000
  
- Supply is decreasing
  - Reduction in graduating engineers during the past 15 years
  - Decrease in power engineering graduates

# *Reflecting Upon Industry Events*

- Price Spikes → ▪ Generation Boom, Price Bust, Credit Crunch
- Mergers Galore! → ▪ Cost Cutting: Increased System Utilization
- Big, Bad Outages → ▪ Fix It or Else! Re-gain Confidence
- Are Lights on in CA? → ▪ Regulator Unknowns  
▪ FERC Pursues Std Market Design, RTOs
- ENRON Started It → ▪ Stocks Plummet  
▪ Focus on Core: Manage Short Term EPS
- Sarbanes Oxley → ▪ Financial Focus: Ensure Compliance
- It is BLACK-Out! → ▪ Standards and Infrastructure Interest

# Power Industry Workforce Overview

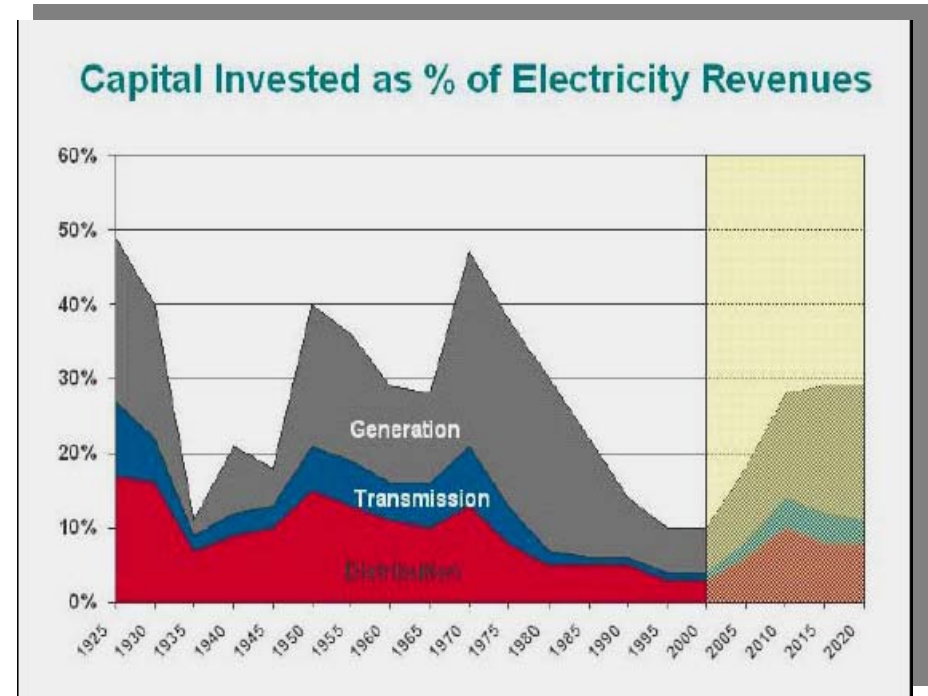
- Historic financial and plant focus: intellectual set aside
- Knowledge is leaving: average age is increasing

## Typical Electric Utility Employee Age Distribution



# *Infrastructure Needs and Expertise Impact*

- Emerging needs
  - Increased maintenance
  - Adaptation of technology
  - Integration of new with old
  - Increased spending
  - Increased environmental and political interests



***Will experience to do basic utility work be available?***

***Will infrastructure be available to attract and train enough talent?***

# *Survey Participation and Approach*

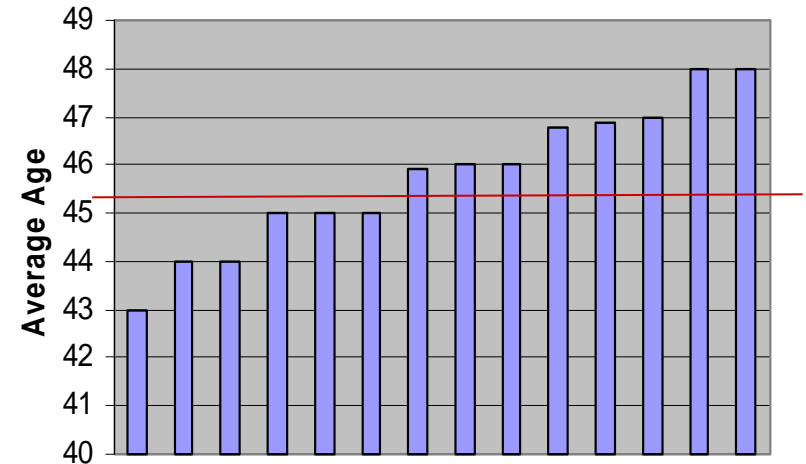
- Survey performed in Fall 2004 - Spring 2006
  - Approximately 30 utilities participated
  - Targeted power delivery in USA and Canadian
- Gathered workforce trends
  - Average age & retirement trends
  - Succession planning
  - Adequacy of hiring pool
  - Five-year availability
- Identify best practices for course correction



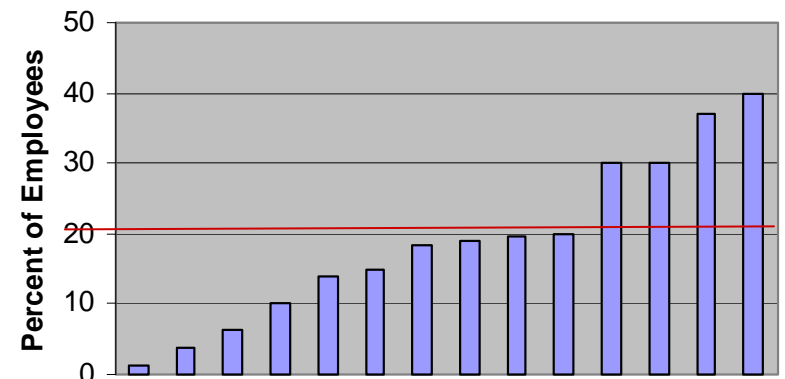
# Average Age & Retirement

- Average age
  - Ranged from 43 to 48
  - Overall average 45.7
  - Similar results from craft, management, and technical
- Forecasted retirements
  - Averaged 20% in next five year
  - Responses varied greatly
  - Some models are created
    - Age-based forecasts
    - Largest motivator is stock price

Utility Employee Average Age



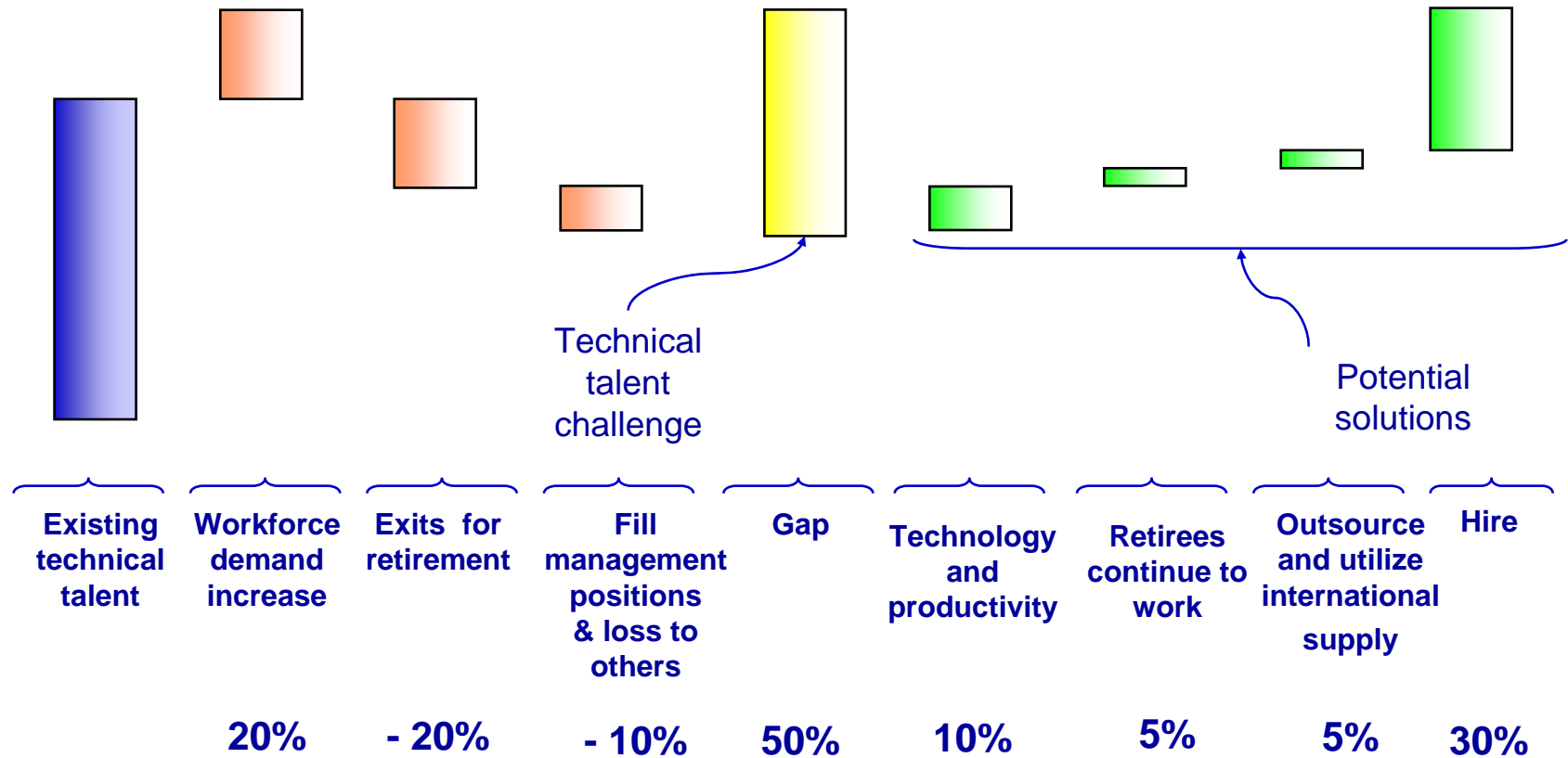
Projected Employee Retirement in Five Years (%)





# Estimated Five-Year Technical Gap

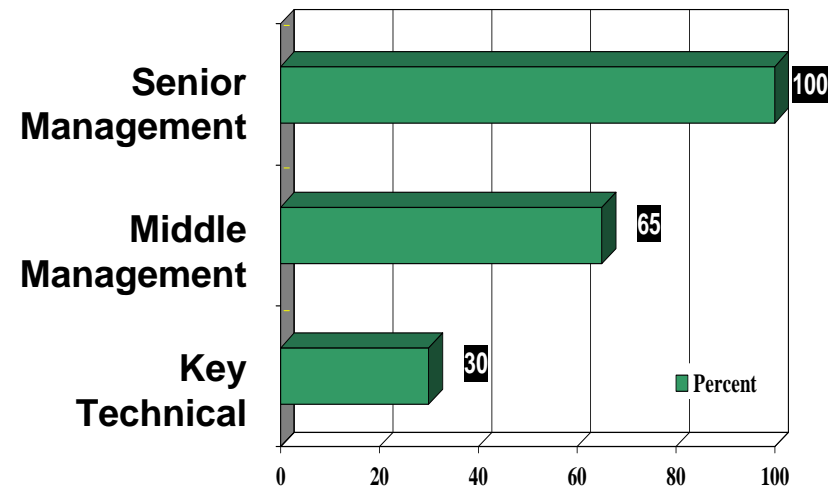
## Workforce Challenge and Potential Solutions



# Succession Planning

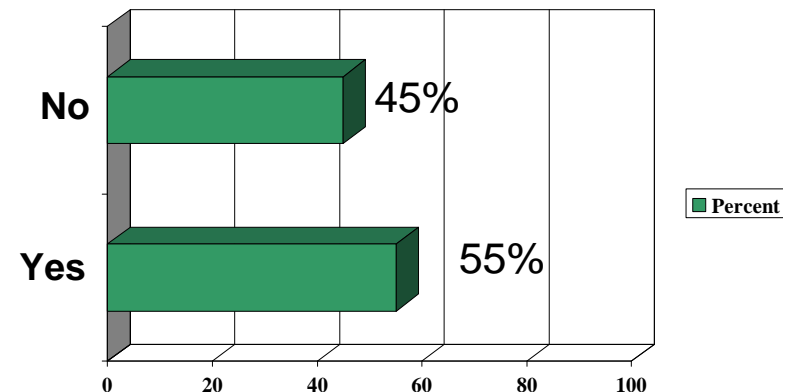
- Senior management
  - Extensive
- Middle management
  - Planning is growing
  - Approximately  $\frac{2}{3}$  complete
- Key technical
  - Isolated activity to date
  - Critical skills being identified

Organizational succession planning



- Hiring pool
  - Some difficulty in finding experienced technical skills
  - Anticipate more difficulty in the future

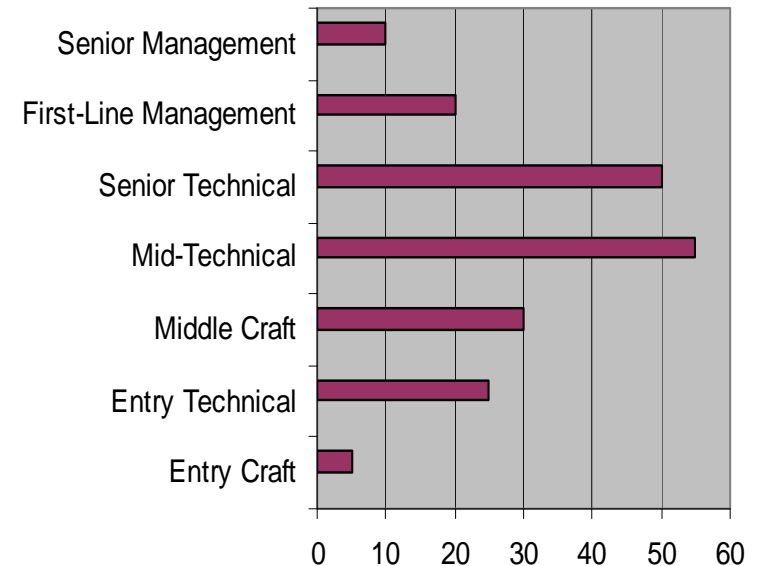
Adequate hiring pool?



# Five-Year Availability

- Demand may increase for:
  - Middle career engineers
  - Senior engineers
  - First-line management
  - Senior management
- Talent shortage prediction:
  - Middle career technical talent
  - Senior career technical talent

Percent of respondents predicting availability shortage in five years by career type



Percent Predicting Availability Shortage

# *Knowledge Transfer*

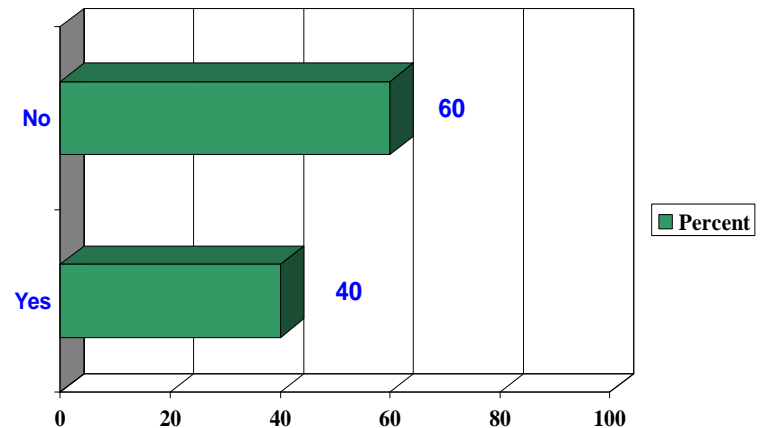
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- All are concerned about the ability to transfer knowledge
- Comments:
  - Fledging knowledge management activities are underway
  - Yet to pursue full-blown knowledge transfer
  - Intention is to hire above core staff levels for transition
  - It takes money to have two people in one job!
  - Retirees will be a source of temporary labor as needed
- All are using e-learning to some extent
- Comments:
  - Applications vary
  - Very limited. Want to go in that direction
  - Offering operator, FERC compliance training and some classes for supervisory and leadership

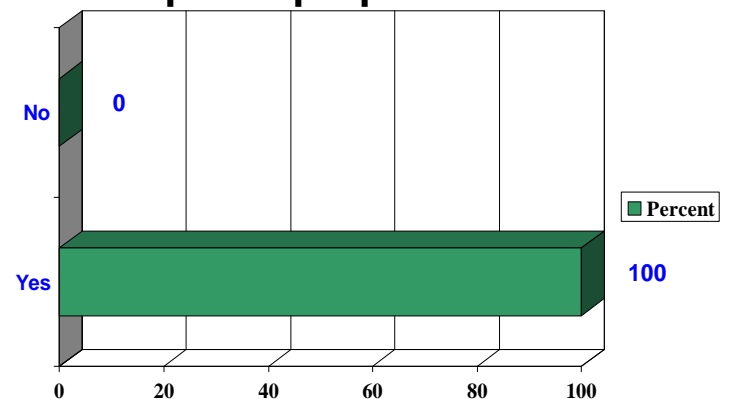
# Relations and Image

- Image perceived to be old fashioned
- Comments:
  - Publicity needed
- Industry organizations can help improve preparedness
  - Communication with schools
  - Awareness as a national concern
  - Alert regulators to factor into decisions: training, development costs, recruiting

Percent of respondents  
Building relations with schools



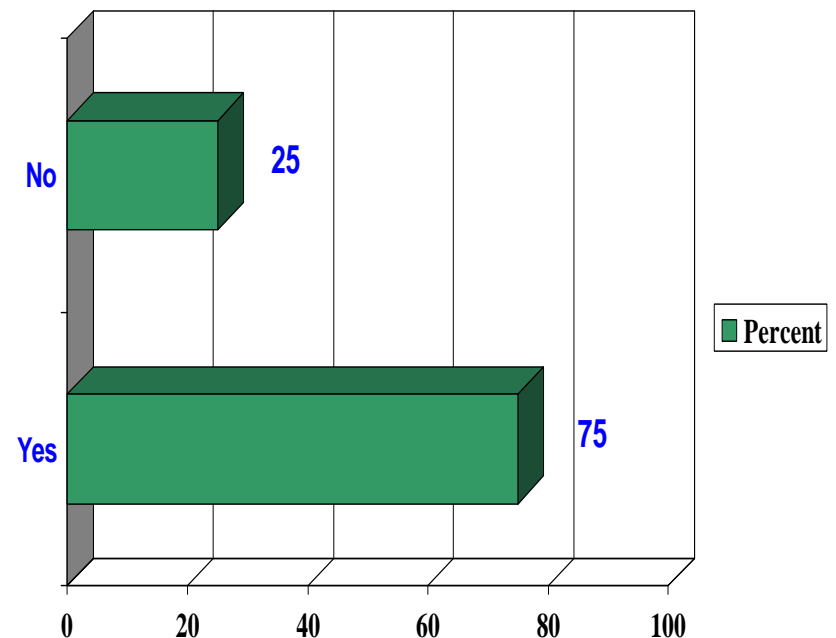
Percent of respondents  
thinking organizations can  
improve preparedness



# Relations and Image

- Most are building relations with colleges and craft schools
- Comments:
  - Engineering, technologists, and apprenticeship programs jointly developed
  - Leaders are on boards
  - Collaborative e-learning development
  - Ongoing scholarships

Percent of respondents  
Building relations with schools



# *Utilize Critical Skills to Target Efforts*

- Most have defined critical skills or knowledge sets
- Critical skills included:

## ***Soft Skills***

- Broad business understanding
- Financial understanding
- Interpersonal skills
- Strategic thinking and planning
- Development
- Communications
- Decision making
- Curiosity
- Emotional IQ
- Learning Agility

## ***Experience / Technical Skills***

- Power Dispatcher
- System Operator
- Relay Technician
- Underground Technician
- Transmission Expertise
- System Planning Engineering Roles
- Design Engineer
- Electric Service Line Workers

# *Knowledge Retention Planning*

- TVA Created Integrated Workforce Plan in 1998
  - Implemented Attrition Survey – Just Ask!
  - Recruiting, Training, Coop / Intern Program
  - Standard Processes and Procedures
  - Cross Organization Peer Team for processes, standards, staffing
  
- Results
  - Successful recruiting
  - Minimal forced reductions
  - Integrated into business planning
  - Knowledge Loss Risk Assessments with 2600 employees





# Knowledge Retention

- Step 1. Conduct a **Knowledge Loss Risk Assessment**
  - A. Assign 1 – 5 for anticipated retirement: ‘5’ in current year, ‘1’ in 6+ years
  - B. Assign 1 – 5 for difficulty to replace: ‘5’ mission critical, ‘1’ common
  - C. “A” x “B” = “C” or Attrition Factor: 25 is high priority with immediate action
- Step 2. **Determine Approach** to Capture Knowledge
  - Conduct interviews
  - Assess consequence of loss
  - Develop plans
    - Codification
    - Engineer it Out
    - Education and Training
    - Alternative Resources
- Step 3. **Monitor and Evaluate**



**Best Practice**

## Lessons:

- *Less at risk than suspected*
- *Greatest risk in specialized technical positions and problem solving*
- *Re-design opportunities emerge*
- *Current procedures are sometimes weak.*

# *Changing Needs and Expectations*

## Baby Boomers



- 20+ years experience
- Comfortable with print
- Well established networks
- Take work seriously
- Loyal, employed for life
- Serve as mentors
- Less diverse

## Generation X



- Upwardly mobile
- Computer savvy
- Prefer on-line media
- Strive for life-balance
- Expect job shifts, training
- Varying needs, flex time
- More diverse

# Technology for Knowledge Retention

- SCADA
- Residential Load Control
- Distribution Automation
- Automated Meter Reading

Device Control & Data Gathering

- Geographic Info
- Customer Systems
- Reliability Focus
- Dist. Management Systems
- Trending

Communication and Computing Evolution & Information Developing

- Design Tool
- Auto Planning Tool
- Reliability Web
- Mobile Communications
- Work & Supply Management

Information Integration, Web, Process / Technology Linkage to Get More for Less, Rapid Change

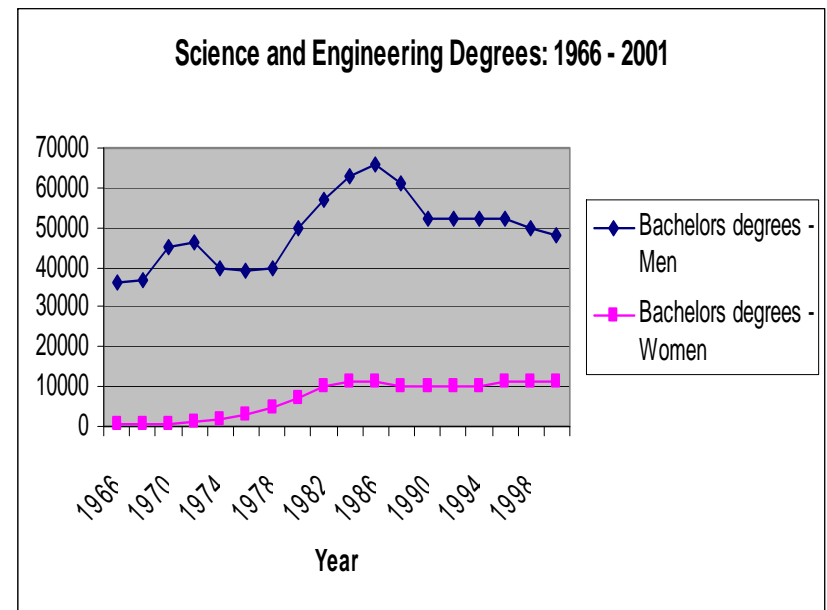


*Technology facilitates knowledge transfer, training and efficiency*

# *Students in Science and Engineering*



- 50% of workforce is women
- In the U.S. women are:
  - 11% of engineering workforce
  - 20% of the undergraduate engineering degrees
- U.S. engineering enrollment
  - Women enrollment is steady
  - Men enrollment is declining



***Opportunity exists to attract more talent***

# *Increasing the Scientific Pool*

- Involve students in 'doing science' prior to grade 9
- Provide opportunities to perceive career options
- Encourage taking all math available in high school
- Provide role model engineering professionals

	<b>7<sup>th</sup> Grade</b>	<b>12<sup>th</sup> Grade</b>	<b>College Entry</b>	<b>College Graduation</b>	<b>College Doctorates</b>
<b>2000 male</b>	<b>1000 male</b>	<b>280 male</b>	<b>140 male</b>	<b>45 male</b>	<b>5 male</b>
<b>2000 female</b>	<b>1000 female</b>	<b>220 female</b>	<b>45 female</b>	<b>20 female</b>	<b>1 female</b>
<b>Study group</b>	<b>Understand math well enough to take advanced high school math classes</b>	<b>Take enough math for a quantitative college major</b>	<b>Enter college with plans to major in science or engineering</b>	<b>Number emerging from college with baccalaureate degree</b>	<b>Number emerging with Ph.D. in quantitative field</b>

***Support efforts to improve awareness and image***

# *Power Engineering Academic Status*

## *Inside USA*

- Retirements outpacing new professor hires
  - Average age increasing
  - Power faculties have ~3 professors
- Viable programs are down
- Students
  - Attracted to other areas
  - Many are international

## *Outside USA*

- New professor hires outpace retirements
  - Power faculties have ~ 10 professors
- Growing enrollment
- Students
  - Positive image
  - Potential provider for U.S. needs

***Work with academia to revitalize educational infrastructure***

# *Prepare for Training*

- Increasing training demand
  - Engineers will not have power backgrounds
  - Retirees will exit before tribal knowledge can be transferred
  
- Increasing need for training investment
  - Budget training at approximately 2% of payroll
  - Set a ratio of training to employees ie 1:300
  - Allocate formal training hours for ie 40 per year
  
- Unique approaches
  - Maintain a “chief” to coach and mentor
  - Utilize suppliers for training
  - Arrange corporate university programs
  - Re-invest in power and trades educational development
  - Develop e-training focusing on practical application



# *Brand while Creating Pipeline*

- **Power Careers... where students:**
  - Are Nominated by high school faculty
  - Enroll in 2-year degree for power plant operations
  - Apply for \$1000 scholarship and work part time
  
- **Future for Kids Partnership ([www.f4k.org](http://www.f4k.org)) ... includes:**
  - Partner with non-profit organizations
  - Use web portals aimed at high school students
  - Offer assessment tools for students on-line
  
- **Boys and Girls Clubs Partnership ... approached by:**
  - Assess students interests and aptitudes
  - Target job shadowing opportunities where there is a match



***Recruit and hire for the long-term***



# *Challenges*

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- Significant forecasted attrition
- Increasing workload
- Declining expertise and practical knowledge
- Limited workforce pipeline
- Declining academic and training infrastructure
- Challenges from international reliance
- Suffering industry image
- Shifting to address long-term needs

# Implications for Supply Chain



# *Recommended Actions*

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- ✓ Create a workforce plan
- ✓ Implement succession planning
- ✓ Extend selected individuals as a 'chief' to mentor
- ✓ Utilize technology
- ✓ Monitor hiring pool adequacy
- ✓ Position for more diversity
- ✓ Establish relationships with schools
- ✓ Migrate to e-learning and formalized training
- ✓ Support efforts to provide practical knowledge
- ✓ Promote industry image
- ✓ Incorporate trends into procurement considerations