



ELECTRICAL POWER ENGINEERING EDUCATION: HOW TO BRIDGE THE GAP BETWEEN INDUSTRY AND UNIVERSITIES

Hardev Juj, P. E.

Chief Engineer and V.P., Planning and Asset Management

Bonneville Power Administration

August 25, 2014



Question 1 – What level of specialization of engineering curricula should be sought for? Is basic, fundamentals knowledge more formative and potentially more effective for industry than up-to-date information ?

- Fundamentals are necessary, but specialized classes in senior year are most important. Benefits of specialized courses:
 - Gives student real scenarios of industry
 - Provides skills that industry needs
 - Provides faster learning curve for students when joining the workforce
- Based on industry, specialized curricula could include instruction on specific software and industry trends.

Fundamentals and specialized skills are necessary



Question 2 – What are the differences between Industry needs and expectations and Academia ones ?

- Communication skills
 - Increased ability in both written and oral
 - Increased training and experience developing and delivering presentations or white papers to diverse audiences
- Specialized technical skills
 - Graduate with broad knowledge, but need more specialized training in areas that relate more to the industry
- Understanding areas beyond just technical items, for example:
 - Generational issues
 - Change management
 - Functioning in Teams
 - Running groups/meetings
 - Economic analysis
 - Legal and contractual knowledge

Communication skills and breadth of non-technical needs



Question 3 – What are the reasons behind the gap between Academia and Industry, if any ?

- Gaps include:
 - Pace at which industry changes – different rate than academia
 - Global picture of the industry
 - Regulatory changes in industry
 - Technical advancements in industry faster than classroom
 - Lack of university and industry funding limits the breadth of study and research areas
 - Lack of faculty's ongoing exposure to the industry

Rapidly changing industry environment



Question 4 – What is the current status of cooperation between Academia and Industry and in particular the interaction between industry and undergraduate/doctoral programs ?

- BPA is working closely with numerous universities. BPA sits on several university advisory boards. Schools include: PSU, UP, WSU, Gonzaga, U of I, OIT, UW, etc
- BPA working with other industries in the area (Intel, Sharp, Tektronix, etc) along with the universities to help direct undergraduate courses and areas for improvement.
- BPA Student Program brings students in and provides “hands on experience” prior to graduation. 25% of BPA’s 450 engineers come through BPA’s student program with 98% retention.
- BPA working/mentoring with high school students during summer program.

Imperative that the industry and academia work together



Question 5 – Is at present the number of PhDs produced every year for the higher education establishment too much to be absorbed by Industry?

- Change in generation sources mix makes planning and operation of the grid very complicated requiring specific and specialized skills
- Expecting shortage in the power industry of Masters and PhDs
- With the advancement of the industry (example synchrophasers), skilled engineers with higher degrees is critical
- With the deployment of new technology such as synchrophasers, creates the need for specialized skills

Industry must define its needs to academia



Question 6 – Should industry be involved in the management of Educational Establishments?

- No, industry should be in an advisory function
 - Suggest Ideas for improvements
 - Provide support to academia
 - Help development short and long term strategies
 - Participate on advisory boards
 - Incorporate more adjunct professors from the industry

Industry needs to be committed and proactive



Item 7 – Power Industry Status (BPA)

- Aging workforce
- Succession planning critical to our survival
- Relationship with educational institutions critical
- Stability vs. glamorous jobs
- Salary structure is not compatible with the importance of the system

Power Industry must start now and be proactive to meet future needs



Conclusions

- Relationship building with the Colleges/Universities is key
 - Students come better prepared with increased knowledge and awareness immediately benefiting the industry
- Reaching out to students early on through high school programs also critical to the long term sustainability of the power industry
- Need to create national and international think tanks to create the future

We need more ambassadors and visionaries to promote and continue to spark the interest of the next workforce to join the industry! **The next generation is our future!**

