

The Northwest Center of Excellence for Clean Energy Centralia College Bellingham Technical College

NSF Grant Research Industry Focus Group Report

**Wednesday, June 4, 2015
The McKinstry Company
Seattle**

Agenda:

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|------------------------------------|---------------------------------------|
| 1. Welcome - | Barbara Hins-Turner |
| 2. Introductions | DC |
| 3. Overview of the NSF Grant Focus | Barbara Hins-Turner/BTC
colleagues |
| 4. The Focus Questions for the day | DC |
| 5. Overview of the process | DC |
| 6. Focus Group discussion | DC + Sara Bowles |
| 7. Wrap - up discussion | DC |
| 8. Next Steps | Barbara Hins-Turner and Grant
Team |
| 9. Exit and Send out | Barbara Hins-Turner |

Email invitation sent to potential panel members:

'The Clean Energy Focus Group will be a consultation with industry and labor subject matter experts on aspects of sustainable energy practices and developments with *a focus on "technology based & engineering technology related applications"*

The outcome of this dialogue will inform the development of a Sustainable Energy program that will align the BTC program with WWU's Institute of Energy Studies Bachelor's program.

It is the Center's hope that it's work on this project will strengthen the labor pool in the Pacific Northwest and elsewhere of qualified applicants who seek long term career options in various aspects of sustainable energy systems. Building this project and grant deliverables on the best available industry expertise and experience will strengthen our case and provide a solid foundation for our work. '

Participants and the Technical Expertise Available:

1. Dana Hickenbottom, Technical Support Engineer and NABCEP Certified Solar PV Technical Sales Professional, ITECK Energy
2. Rodney Scharf, Chief Engineer, Sheraton Seattle Hotel¹
3. Mark Nieman, McKinstry Corporation
4. Randy Ambuehl, NW Washington Electrical Joint Apprenticeship Training Council
5. Joan Weiss, The Worker Center, AFL-C/O
6. Matt Bryant, Grant Manager, Bellingham Technical College
7. Jill Davishahl, Faculty - Mechanical Engineering, Bellingham Technical College
8. Sara Bowles, Center of Excellence for Clean Energy
9. Barbara Hins-Turner, Director, Center of Excellence for Clean Energy

Report:

The panel discussed and clarified the generally accepted interpretation of three descriptors that are frequently used in discussions on energy systems, technologies, sources, services and business practices. These three terms are as follows:

1. **Sustainability** as measured by - environment protection, economic viability and social responsibility.
2. **Clean energy** as measured by no detrimental impact on the environment
3. **Conservation** as measured by all the strategies associated with efficiency of energy use in buildings and elsewhere
4. **Re-newables** as measured by solar, geo-thermals, tidal, wind i.e., non petroleum based energy sources.

Renewable, Sustainable and Clean Energy Systems:

The sector of the construction industry identified as the one composed mainly of specialty contractors like those engaged with the manufacture, installation or repair of solar technology systems and components is part of the renewable energy sector of the energy industry. This sector received a big impetus when the State legislature adopted certain consumer incentive schemes to help get it established. These incentive schemes for customers to invest in solar technology for their property and that are currently in place do sunset in a few years. If they do so as scheduled, the sector that is recognized as focused on renewable energy sources like

¹ All numbering and lettering in this report is for ease of reference only.

solar, wind and thermal may have a smaller foot print in the energy production side of the industry.

Although no utility representatives were present at this forum it is understood however that the large utilities by and large are not vested in a growing renewable sector that includes Solar. Utility revenues will be threatened if the renewable sector gathers steam hence the legislature in Washington State may be under increasing pressure not to renew the subsidy or incentive schemes for solar systems installation. Although the percentage of the State's energy that is captured on the grid from solar installations is very small, nevertheless the current subsidy or incentive schemes that support the solar technologies are not sustainable and sustainable systems, technologies, energy sources and business practices are big determinants in energy policy development.

Rodney Sharf of the Seattle Sheraton Hotel picked up the conversation on the 'Built Environment,' and spoke from the perspective of the large hotel chain of 400 hotels that Sheraton has nation-wide. Rodney directs all engineering decisions and activities for the Sheraton Hotel in Seattle. In focusing on energy needs and technologies within the chain - Rodney described how Sheraton has been an early adopter of Compact Florescent Bulbs or CFL technology. This technology is significantly more energy efficient than other systems and since the 'built environment,' accounts for up to one third of all state energy use - this CFL technology and products play an important role in reducing energy demand on the grid. In parallel with these improvements in lighting - a similar shift is occurring in the technology of chillers, boilers and HVAC systems in the built environment - all geared towards increasing efficiency of energy use and therefore, reducing costs.

Closely linked to approaches that increase efficiency are those that foster energy conservation. The Sixth Energy plan from the Northwest Power and Conservation Council purports that the bulk of the Northwest region's projected energy needs over the next 20 years will come from various energy conservation strategies and policies. In this context, projects like the Bullitt Zero Energy Building in the central district of Seattle will help inform the industry and the legislature on some of the preferred energy conservation practices to pursue. LED lighting for example may become one of the features of all new highly efficient buildings.

These conservation approaches will influence materials composition and design, window designs like those that have solar panels built into the glass and of course new codes and practices. Besides the determinants of achieving new levels of efficiency and conservation other factors will include, safety, environment protection, human health, the creation of 'good jobs,' and of course, economics. To adopt 'sustainable systems, technologies or business practices,' is to gain public support and strengthen a company's perception in the public mind. In that sense, it has become 'business common sense,' to pursue all that is sustainable.

The technology of inverters, that is the technology that converts AC power to DC power and vice versa has become a prominent component especially within solar technology systems and

wind turbines. Inverters have much to do with how energy is managed and controlled in a building. The National Electrical Contractors Association (NECA) governs and oversees electrical coding changes for the 'built environment.' NECA plays a most important role in guarding the larger interests of electrical contractors and the public interest while monitoring and auditing new technologies and systems that call for adjustments and additions to the electrical code. The code sets the minimum standard but companies like McKinstry seek to go beyond the minimum. NECA therefore, serves as the primary gate keeper on standards and practices within the Energy and construction industries in the US.

Associated with renewable energy sources is the technology of energy storage. This represents another component of the technology infrastructure and technology supply chain around renewable energy generation that is taking root and spawning new companies and entrepreneurs. Both wind and solar energy generation is aided by compatible storage technology and as this is evolving - new buildings - like the Bullitt Zero Energy building - are being designed with built in energy storage and transmission capabilities so energy from roof-based solar panels, for example, is fed into the grid during daylight hours. Codes and standards around these technologies and designs are in flux and whatever emerges from the debates, lobbying and 'positioning' that is going on will determine the face of the energy industry going forward.

Knowledge, Skills and Aptitudes - looked for in new hires:

In discussing the broad question of 'who,' the industry and all its sectors will be looking for in the months and years to come - the panel shared several perspectives. The knowledge, skills and aptitudes or KSAs that companies like McKinstry, ITEK Energy and Sheraton Hotels will be seeking will of course depend on the particular positions and divisions within the companies. However several points were made about the main KSAs that will be valued in new engineers with a two or four year level degree. The following KSAs were identified as especially important:

- HVAC technology specialists
- Pneumatics, Hydraulics and Solar Technologies
- Electronics
- Instrumentation and Building Controls
- Static Engineering
- Mechanical Engineering
- Natural Gas (NG) technology
- Remote control systems of all kinds

Some more specific KSAs looked for include:

- Utility Bill Analysis and extracting information from a range of data loggers
- Calculating house power loads
- Communicating with customers.
- Doing data entry
- Mechatronics,
- Basics of Fluid Transportation systems

Those who can troubleshoot across several different technology systems will be particularly valued. Employers will look for candidates who are 'knowledge hungry,' who have verifiable 'hands-on' skills and who can communicate in writing, cogently, what they have found and what they have done to solve a problem. Such candidates will communicate a passion for their work and the industry. A baseline KSA is the basic science of physics, chemistry and math. With such a foundation a person can study and understand new products, applications and technologies and is more likely to troubleshoot successfully across multiple systems. The well-rounded technician is who many companies search for but cannot find. Typical position titles associated with implementing or supporting sustainable energy systems and practices include:

- Energy engineers
- AEE Certified engineers
- CEM certified engineers
- Sales staff
- AKA project managers
- Program Managers
- Commissioning agents
- Functional performance testers
- Water Balancing Technicians
- Design Engineers
- Construction engineers
- Sourcing engineers
- Systems engineers

Point was made that most companies - because of the shortage of people with the required KSAs - operate with a labor force that is about 10% below optimum.

In addition, on the 'knowledge hungry' aptitude employers value recruits who know how to keep themselves up to date, who scour the literature and read about the technologies emerging, about industry trends and reports, who seek feedback from customers and who are highly motivated to broaden and deepen their KSAs with respect to pertinent and emerging technologies. The panel also mentioned the need to be flexible as things change and to always be teachable. Those who enter a company, who for some reasons are not teachable, may not last. Those that can function well in an integrated environment where troubleshooting across technical boundaries is required - will do well in this industry.

Much attention was devoted to discussing the importance of ethics in this industry. 'Being able to know what is the right thing to do,' was how one described the ethical challenge. It was about seeking the longer term solutions to an energy or business problem that put the value of sustainability and social justice ahead of the quarterly profits. Reference was made to the existence of the modern 'snake oil' salesmen who seek to maximize their profit often at the expense of 'doing the right thing.'

Several panel members expressed concern about the big emphasis on STEM subjects in K-12. The concern was how this trend seems to be occurring at the expense of the career and technical education (CTE) curriculum. Those who are kinesthetic learners perform best in a hands-on setting like a CTE lab and may not acquire the KSAs needed for college and success in this industry unless they have a 'hands-

on' learning environment. Several panel members lamented about the very low interest in the trades amongst young people, their parents and their teachers. This misperception flies in the face of salaries and wages offered to trades people, the opportunity in the trades for the budding entrepreneur and the broad demand for well rounded technicians not just in the Northwest.

In discussing the K-12 community it was pointed out that young people today do not have the IT hurdle their fathers and grandfathers had to face but their deficits tend to be in the non IT technologies of motors, drives, hydraulics, pumps, chillers, boilers, PLCs and so forth . A journey level knowledge of energy technology and systems provides a foundation for many different career pathways and the panel felt that the drive toward a STEM-based K-12 curriculum may be blocking many young people from the pathways to the more traditional trades. That said, all were reminded by the panel that the 'basics of engineering' were not changing despite the proliferation of new technologies and gadgets and if attention was given to teaching flexibility on a broad base of KSAs, graduates would be well positioned to establish a foothold and build a lucrative career in the energy industry.

Some parting words of advice to the educators present from the panel members is as follows:

- Keep the curriculum general.
- Avoid too much specialization.
- Focus on the basics.
- Include ethics & STEM.

The forum discussion was ended at 3:00PM and Barbara Hins-Turner thanked all panel members and invited their continued participation with this grant project that Bellingham Technical College is spearheading.

Appendices:

Council Questions used at the focus group

The Sixth Plan of the Northwest Energy Conservation Council

(See: <https://www.nwcouncil.org/energy/powerplan/6/plan/>)

Questions that were employed during this Focus Group were:

A. Renewable or Sustainable Energy Systems

1. Describe your company with regard to services, products, and markets.
2. What are some of the sustainable business practices your company employs?
3. What is the business rationale for implementing sustainable business practices?
4. How is your company using, promoting, supporting or designing sustainable energy systems?
5. What technologies have you invested in to support these systems?

B. Preferred Knowledge, Skills and Aptitudes

1. What positions in your company have major responsibilities related to sustainable systems, services, and products?
2. What are the key KSAs for these positions?
3. How would you describe current supply of and demand for workers with these KSAs in your company, and in the larger energy industry?

C. Industry Trends

1. How do you see sustainable energy systems, the related positions, and the associated KSAs evolving in the next 5-10 years?
2. What training will workers need to keep pace with evolution in the field?
3. How would you describe the roles of engineers in your company and in the larger energy industry?
4. How do you see the roles of engineers in the energy industry evolving in the next 5-10 years?
5. What training will engineers need to keep pace with evolution in the field?

D. Recommendations

1. As we seek to design a program to train workers – specifically engineers – for careers in sustainable energy, what advice or recommendations do you have for us?